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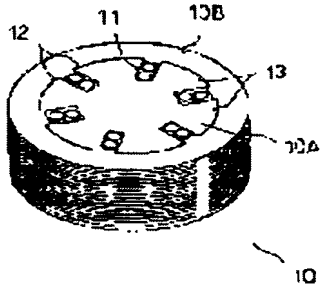
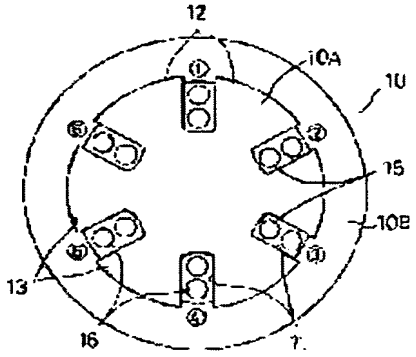
(54) POWER GENERATOR

(57)Abstract:
PURPOSE: To constitute a power generator in such a way that its secondary winding interlinking with its primary winding to generate an electromotive force larger than that supplied to the primary winding by combining the electromotive force generated by an alternating magnetic field and progressive magnetic field formed by alternating magnetic fluxes generated by an exciting current flowing through the primary winding and the electromotive force generated by a revolving magnetic field.



CONSTITUTION: An iron core 10 is composed of a cylindrical core section 10A and annular core section 10B. The section 10A is provided with six axial slots 11 provided at regular intervals on the outer peripheral surface of the section 10A. The section 10B has six notched grooves 13 in which the front ends of projecting sections 12 between slots 11 are put. A primary winding 15 connected to a three-phase AC power source is put in the interior sides of the slots 11 and secondary winding 16 is put in the entrance side of the slots 11. When a three-phase exciting alternating current is made to flow through the primary winding 15, an alternating magnetic field and progressive magnetic field are formed by alternating magnetic fluxes and an electromotive force is induced, because the magnetic fields are interlinked with the secondary winding 16. Therefore, electric power larger than that supplied to the primary winding is outputted from the secondary winding except the initial starting time of a power generator.



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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The power plant characterized by having the primary winding which produces a travelling magnetic field in addition to alternating field, and the secondary winding allotted so that it may interlink to the alternating field and the travelling magnetic field which are produced by this primary winding.
[Claim 2] The power plant according to claim 1 characterized by supplying a part of electromotive force [at least] guided to said secondary winding to said primary winding.
[Claim 3] The alternating field and the travelling magnetic field which are produced by said primary winding are a power plant according to claim 1 or 2 characterized by being generated from a polyphase current including a direct current, a single-phase alternative current, a two phase alternating current, or the three-phase alternating current.
[Claim 4] Said primary winding and secondary winding are a power plant according to claim 1 or 2 characterized by being arranged in the same magnetic circuit.
[Claim 5] The power plant according to claim 1 or 2 characterized by adjusting the electrical potential difference and current of the electromotive force guided to this secondary winding by the turn ratio of said primary winding and a secondary winding.
[Claim 6] The power plant according to claim 1 or 2 which makes the upstream said primary winding and secondary winding, and is characterized by preparing secondary [which is relatively moved to said upstream based on the current guided by said travelling magnetic field].
[Claim 7] Said travelling magnetic field is a power plant according to claim 1 characterized by being rotating magnetic field.
[Claim 8] The alternating field and rotating magnetic field which are produced by said primary winding are a power plant according to claim 7 characterized by being generated by the polyphase current including a direct current, a single-phase alternative current, a two phase alternating current, or the three-phase alternating current.
[Claim 9] Said primary winding is a power plant according to claim 7 characterized by being the multi-electrode volume which is a symmetry volume of the polyphase containing a three phase, and contains 4 ****.
[Claim 10] The power plant according to claim 8 characterized by making into size the number of alternation of the alternating field produced by the polyphase current including said direct current, a single-phase alternative current, a two phase alternating current, or the three-phase alternating current, and the rotational frequency of rotating magnetic field.
[Claim 11] Said secondary winding is a power plant according to claim 9 characterized by being the symmetry volume of said primary winding and number of inphases.
[Claim 12] The power plant according to claim 9 characterized by shortening the period of said polyphase current and making the number of alternation of said alternating field, and the rotational frequency of rotating magnetic field into size.
[Claim 13] Said primary winding and secondary winding are a power plant according to claim 11 characterized by being arranged in the same magnetic circuit.
[Claim 14] The coil part to which said primary winding and a secondary winding each correspond is a power plant according to claim 13 characterized by being approached and arranged in the iron core which constitutes said same magnetic circuit.
[Claim 15] Claim 7 characterized by preparing the rotator by which a rotation drive is carried out based on the current which has a revolving shaft to the revolving-shaft heart of said rotating magnetic field, and is guided by

the rotating magnetic field of Perilla frutescens (L.) Britton var. crispa (Thunb.) Decne. as a stator in a said primary-winding and secondary-winding side thru/or a power plant given in either of 14.
[Claim 16] Claim 7 characterized by preparing the stator which a said primary-winding and secondary-winding side is used [stator] as the rotator which has a revolving shaft to the revolving-shaft heart of said rotating magnetic field, and carries out the rotation drive of this rotator based on the current guided by said rotating magnetic field thru/or a power plant given in either of 14.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the power plant as a source of electrical energy which supplies electrical energy to a converter, a load circuit, etc. by self generating in more detail about a power plant.
[0002]
[Description of the Prior Art] Conventionally, there is the following as this kind of a power plant.
a) The hydraulic power unit which produces electrical energy using the fall energy of the water in a high place.
b) Coal, a fuel oil, thermal power station equipment that produces electrical energy using the heat energy of a fuel like combustible gas.
c) Nuclear-electric-power-generation equipment which produces electrical energy using the emission energy which the reaction of the process of nuclear fission depends.
d) The solar power plant which produces electrical energy using the solar energy of solar heat energy or solar light energy.
e) Wind power equipment which produces electrical energy using wind-force energy.
f) The chemistry power plant which produces electrical energy using the chemical energy based on the chemical reaction which gives the product of a low energy content occurring, the so-called cell.
[0003]
[Problem(s) to be Solved by the Invention] However, there are the following troubles in each power plant mentioned above. Are on the natural environment according to dam construction in a hydraulic power unit, and they are a carbon dioxide, NOx, and SOx in thermal power station equipment. In addition, there is a trouble on the natural environment based on abandonment processing of heavy metal, such as mercury on [of an on / the natural environment based on the air pollution by exhaust gas /like] the natural environment according to nuclear accident and nuclear waste in nuclear-electric-power-generation equipment further used for a cell at a chemical reaction, nickel, and KADONIUMU.
[0004] On the other hand, although a solar power plant and wind power equipment do not have a bad influence on natural environment, since the days which can be used in every year in a solar power plant are restricted, they have a trouble on adequate supply of electrical energy with wind power equipment for the intermittency of wind-force energy.
[0005] This invention carries out the purpose of solving such a trouble, is stabilized without destroying natural environment, can supply electrical energy, and is to offer the power plant based on a new principle miniaturizable moreover.
[0006]
[Means for Solving the Problem and its Function and Effect] The power plant by this invention is having the primary winding which produces a travelling magnetic field in addition to alternating field, and the secondary winding allotted so that it may interlink to the alternating field and the travelling magnetic field which are produced by this primary winding, in order to attain the purpose mentioned above.
[0007] Thus, if constituted, the electromotive force by the alternating field and the electromotive force according to the travelling magnetic field further will be guided to a secondary winding by the alternating field and the travelling magnetic field which are produced by the alternate magnetic flux by the exciting current which flows to a primary winding. And since the electromotive force guided to a secondary winding based on alternating field becomes almost equal to what deducted loss of some, such as copper loss and iron loss, from the power supplied in order to pass an exciting current to a primary winding, the electromotive force with which

the electromotive force guided based on rotating magnetic field consists of power conjointly supplied to the primary winding size is guided to a secondary winding, and self generating is performed.
[0008] Therefore, it can be stabilized without destroying natural environment, electrical energy can be supplied, and, moreover, it can miniaturize. If it constitutes so that a part of electromotive force [at least] guided to said secondary winding may be supplied to said primary winding, self generating will be performed without needing supply of the electrical energy from the outside except for the time of early starting.
[0009] In addition, the alternating field produced by said primary winding and a rotating-magnetic-field **** travelling magnetic field may be produced from a polyphase current including a direct current, a single-phase alternative current, a two phase alternating current, or the three-phase alternating current. By the way, the period of the direct current to which the number of alternation of the alternating field produced by the polyphase current including said direct current, a single-phase alternative current, a two phase alternating current, or the three-phase alternating current and the rotational frequency of rotating magnetic field are passed intermittently in a direct current is shortened, and the electromotive force which the period of the alternating current is shortened in the case of a single-phase alternative current, a two phase alternating current, and a polyphase current, and is guided to size, then said secondary winding serves as size noting that said travelling magnetic fields are rotating magnetic field. Moreover, if it constitutes so that it may be the multi-electrode volume in which said primary winding is the symmetry volume of the polyphase containing a three phase, and contains 4 ****, the electromotive force guided to said secondary winding will serve as size as the source resultant pulse number of a polyphase volume and the pole of a multi-electrode volume increase. In addition, as for said secondary winding, it is desirable that it is the symmetry volume of said primary winding and number of inphases in this case. In addition, the same thing can be said also when a travelling magnetic field differs from rotating magnetic field.
[0010] Moreover, as for the electrical potential difference and current of the electromotive force guided to said secondary winding, it is desirable to adjust by the turn ratio of said primary winding and a secondary winding. In addition, as for said primary winding and secondary winding, it is desirable that it is arranged in the same magnetic circuit, and the coil part to which said primary winding and a secondary winding each correspond further is approached and arranged in the iron core which constitutes said same magnetic circuit.
[0011] In addition, so that the rotator by which a rotation drive is carried out based on the current which has a revolving shaft to the revolving-shaft heart of said rotating magnetic field, and is guided by the rotating magnetic field of Perilla frutescens (L.) Britton var. crispa (Thunb.) Decne. as a stator in a said primary-winding and secondary-winding side may be prepared Or if it constitutes so that the stator which a said primary-winding and secondary-winding side is used [stator] as the rotator which has a revolving shaft to the revolving-shaft heart of said rotating magnetic field, and carries out the rotation drive of this rotator based on the current guided by said rotating magnetic field may be prepared, in addition to a power plant, it can use also as an induction motor. Moreover, said primary winding and secondary winding are made into the upstream, and if it constitutes so that it may prepare secondary [which is relatively moved to said upstream based on the current guided by said travelling magnetic field], in addition to a power plant, it can use also as a linear motor.
[0012] According to this invention, self generating which is stabilized without destroying natural environment and can supply electrical energy can be performed, and self generating can carry out, without moreover needing supply of the electrical energy from the outside except for the time of early starting. Therefore, it is [in / including a noncommercial use which is making the motor drive that it is also with the electrical energy /all electrical machinery and apparatus] very useful as well as especially the thing for which the conventional hydraulic power unit, thermal power station equipment, nuclear-electric-power-generation equipment, a solar power plant, wind power equipment, a cell, etc. can be replaced, and electrical energy can be supplied.
[0013] Other purposes of this invention are made clear from the detailed explanation mentioned later. However, although detailed explanation and a detailed concrete example explain the most desirable embodiment, since it is clear from the detailed explanation for this contractor, various modification and deformation of the pneuma of this invention and within the limits are described only as a concrete example.
[0014]
[Example] Next, it explains, referring to a drawing to sequential per concrete each example of the power plant by this invention.
[1st example-3 phase alternating current 2 pole concentration (all knots) volume] In drawing 1 and drawing 2 , the iron core 10 consists of cylindrical iron core section 10A and circular ring tubed iron core section 10B by which fitting of this cylindrical iron core section 10A is carried out to that centrum, and it is mutually combined

magnetically with that cylindrical iron core section 10A. while this cylindrical iron core section 10A carries out the laminating of the circle configuration sheet steel and being built — a peripheral face side — a hoop direction — regular intervals — and six slots 11 which meet in that direction of an axis are formed. moreover — — while circular ring tubed iron core section 10B carries out the laminating of the sheet steel in a circle similarly and being built — an inner skin side — a hoop direction — regular intervals — and six cut slots 13 where it meets in the direction of an axis, and the tip side of the lobe 12 between the slots 11 of cylindrical iron core section 10A is inserted are formed. In this way, iron cores 10 are assembly ******** by carrying out fitting of the cylindrical iron core section 10A to the centrum of circular ring tubed iron core section 10B, making the lobe 12 of cylindrical iron core section 10A insert along the cut slot 13 of circular ring tubed iron core 10B.

[0015] It is allotted and is inserted in the back side within the slot 11 of said cylindrical iron core section 10A as drawing 3 (b) is indicated that U plane 1 coil 15A which is the primary winding 15 connected to the three-phase-alternating-current power source 14 as shown in drawing 3 (a), V plane 1 coil 15B, and W plane 1 coil 15C are also for the three phase symmetry volume of Y connection. Moreover, it is allotted and is inserted in the near side within a slot 11 as U2 phase-winding 16A and V2 phase-winding 16B and W2 phase-winding 16C which is the secondary winding 16 shown in drawing 3 (a) is similarly shown to drawing 3 (c) that the three phase symmetry volume of Y connection is also. In addition, sign ** in drawing 2 and drawing 3 (b), and (c) - ** show the slot number.

[0016] In this way, if the balanced three-phase alternating currents ia1, ib1, and ic1 are passed from the three-phase-alternating-current power source 14 as an exciting current to U plane 1 coil 15A which is a primary winding 15, V plane 1 coil 15B, and W plane 1 coil 15C Each alternating field 17 and the rotating magnetic field 18 which are kinds of the travelling magnetic field which rotates one time clockwise between 1 cycles of the balanced three-phase alternating currents ia1, ib1, and ic1 arise as shown to drawing 4 by the alternate magnetic flux produced by these balance three-phase alternating currents ia1, ib1, and ic1. On the other hand, the linkage of U2 phase-winding 16A and V2 phase-winding 16B and W2 phase-winding 16C which is a secondary winding 16 is carried out to each [these] alternating field 17 and rotating magnetic field 18, and the balanced three-phase alternating currents ia2, ib2, and ic2 flow as the electromotive force by each alternating field 17 and rotating magnetic field 18 is guided to these U2 phase-winding 16A and V2 phase-winding 16B and W2 phase-winding 16C and it is shown in drawing 3 (a) and (c).

[0017] Thus, the electromotive force guided to a secondary winding 16 The alternating field 17 by the primary winding 15 and the induced electromotive force by rotating magnetic field 18 further An additive rate, From the power of the balanced three-phase alternating currents ia1, ib1, and ic1 which passed the electromotive force guided to a secondary winding 16 based on alternating field 17 to the primary winding 15 to and copper loss Since it becomes almost equal to what deducted loss of some, such as iron loss, it becomes size from the power supplied to the primary winding 15, and self generating is performed.

[0018] In addition, although the case of 2 pole concentration (all knots) volume was explained in this example It is made slot 11' of the twice as many number as this. To these slot 11' Drawing 5 (a), (b), (— c —) — being shown — having — **** — as — for example, — a lap winding — a primary winding — 15 — ' — it is — U — a plane 1 — a coil — 15 — A — ' — V — a plane 1 — a coil — 15 — B — ' — and — W — a plane 1 — a coil — 15 — C — ' — a secondary winding — 16 — ' — it is — U — two — a phase winding — 16 — A — ' — — V — two — a phase winding — 16 — B — ' — and — W — two — a phase winding — 16 — C — ' — If it allots, it will become 4 pole concentration (all knots) volume, 4 pole rotating-magnetic-field 18' is produced as shown in drawing 6 , and it rotates one time clockwise between the two cycles of the balanced three-phase alternating currents ia1, ib1, and ic1. The rotating magnetic field of six or more poles can be obtained similarly. Thus, if rotating magnetic field are made into a multi-electrode, the more it makes it a multi-electrode, the more a secondary winding 16 and the electromotive force guided to 16' will serve as size.

[0019] Although the case of a concentration (all knots) volume was explained in this example, in being a distribution (all knots) volume In 4 pole distribution (all knots) volume to 36 slot 11" For example, drawing 7 (a), (— b —) — (— c —) — being shown — having — **** — as — for example, — a lap winding — a primary winding — 15 — " — it is — U — a plane 1 — a coil — 15 — A — " — V — a plane 1 — a coil — 15 — B — " — and — W — a plane 1 — a coil — 15 — C — " — further — a secondary winding — 16 — " — it is — U — two — a phase winding — 16 — A — " — V — two — a phase winding — 16 — B — " — and — W — two — a phase winding — 16 — C — " — it allots — ****ing . Others are the same as that of the above-mentioned.

[0020]

[Equation 1]
なお、図5（a），（b），（c）および図7（a），（b），（c）における符号①～⑫，①～⑫は、同様にスロット番号を示している。

[0021] The power plant of [Modification(s)], next the above-mentioned three-phase-alternating-current 4 pole distribution (all knots) volume is made into an example, and the case where this power plant is used also as an induction motor is explained.
[0022] In drawing 8 and drawing 9 , in the stator frame 20 of the shape of a cylindrical shape which has a vertical wall, it is fixed to the stator frame 20 in the shape of the same axle, and the circular ring tubed iron core 21 is established. the inner skin side of this circular ring tubed iron core 21 — a hoop direction — regular intervals — and 36 slots 22 are formed along that direction of an axis. A primary winding 23 is allotted to the back side within these slots 22, a secondary winding 24 is allotted to a near side, it is the three phase symmetry volume of a three-phase-alternating-current 4 pole distribution (all knots) volume, and these primary windings 23 and a secondary winding 24 are arranged as above-mentioned by the lap winding.
[0023] by the way, in the centrum within the circular ring tubed iron core 21, it has the revolving shaft 29 currently supported free [rotation] through each bearings 27 and 28 by each holes 25 and 26 which are located in the axis of rotating magnetic field and prepared in the vertical wall of the stator frame 20 — cylindrical — the conductor 30 is formed. in this way, cylindrical [make the circular ring tubed iron core 21 side into a stator and] — the rotating magnetic field produced by the primary winding 23 by using a conductor 30 side as a rotator — the — cylindrical — cylindrical [as a rotator] in it being also at the electromagnetic force according to these rotating magnetic fields and induction field by the induction field based on the current guided to the front-face side of a conductor 30 — a conductor 30 rotates. In addition, it cannot be overemphasized that the electromotive force which consists of power supplied to the primary winding 23 as above-mentioned size is guided to a secondary winding 24.
[0024] moreover, it is shown in drawing 10 and drawing 11 — as — cylindrical shape-like stator frame 20' — the circular ring tubed which prepares circular ring tubed iron core 21' fixed to the low wall of that stator frame 20' in the shape of the same axle inside, and fits loosely into the circular ring tubed space between the peripheral face of this circular ring tubed iron core 21', and the inner skin of stator frame 20' — a conductor — you may make it prepare 30' in this case — and also slot 22' is formed in the peripheral face side of circular ring tubed iron core 21' — circular ring tubed — a conductor — it is [that revolving-shaft 29of 30" is located in the axis of rotating magnetic field in the centrum of circular ring tubed iron core 21', etc. and] the same as that of the above-mentioned.
[0025] In addition, although the case of a three-phase-circuit alternating current 4 pole distribution (all knots) volume was made into the example and explained, it cannot be overemphasized that you may be the above-mentioned three-phase-circuit alternating current 2 pole concentration (all knots) volume and 4 pole concentration (all knots). moreover, circular ring tubed iron core 21 and 21' side is made into a stator, and cylindrical — a conductor 30 and circular ring tubed — conductor 30' — although the side was explained as a rotator, it has a revolving shaft in the circular ring tubed iron core 21 and 21' — making — the circular ring tubed iron core 21 and 21' — a side is used as a rotator and cylindrical — a conductor 30 and circular ring tubed — conductor 30' — it is good also considering a side as a stator.
[0026] this example — setting — a slot 11, 11', 11", 22, and 22', although a primary winding 15, 15', 15", and 23 were allotted to the inner back side and a secondary winding 16, 16', 16", and 24 were allotted to the near side on the contrary — a primary winding — 15 — 15 — ' — 15 — " — 23 — a near side — a secondary winding — 16 — 16 — ' — 16 — " — 24 — the back — a side — you may allot — a primary winding — 15 — 15 — ' — 15 — " — 23 — and — a secondary winding — 16 — 16 — ' — 16 — " — 24 — a near-side side and a back side — fair — you may allot . Moreover, although the case of the three phase symmetry volume of Y connection was explained, you may be the three phase symmetry volume of delta connection. Furthermore, although the case of a lap winding was explained, you may be a wave winding or a chain winding, and although the case of a full pitch winding was explained, you may be a short pitch winding, and so to speak, you may be what kind of coil approach.
[0027] this example — setting — an iron core — ten — ten — ' — ten — " — 21 — 21 — ' — sheet steel — a laminating — carrying out — having built — although — winding — you may build — being massive — a ferrite — sinter — carrying out — you may build — so to speak — the magnetic substance — constituting — having — a thing — it is — if — what kind of thing — you may be .

[2nd example—single—phase alternative current capacitor split—phase type 4 pole distribution (all knots) volume] In drawing 12 (a), (b), and (c) an iron core 40 It consists of cylindrical iron core section 40A and circular ring tubed iron core section 40B which fitting of this cylindrical iron core section 40A is carried out to that centrum, and is mutually combined with that cylindrical iron core section 40A magnetically like the case of the 1st example. the peripheral face side of this cylindrical iron core section 40A — a hoop direction — regular intervals — and to the back side within 16 slots 41 currently formed along that direction of an axis Main—winding 43A of the single phase coil which is the primary winding 43 connected to the single—phase alternative current power source 42 as drawing 13 is shown, and auxiliary winding 43B which has a capacitor 44 2 phase symmetry volume, As there is a 90—degree phase angle, it is electrically allotted and inserted between both main—windings 43A and auxiliary winding 43B, as it is illustrated that a lap winding and a full pitch winding are also. Moreover, as a 90—degree phase angle has similarly electrically main—winding 45A of the single phase coil which is the secondary winding 45 shown in drawing 13 , and auxiliary winding 45B which has a capacitor 46 in both main—windings 45A and auxiliary winding 45B as a two phase symmetry volume, a lap winding, and a full pitch winding are also, it is allotted and is inserted in the near side within a slot 41.

[0028] in this way, if a single—phase alternative current i1 is passed from the single—phase alternative current power source 42 as an excitation power source to a primary winding 43, it will flow to main—winding 43A and auxiliary winding 43B — each — the alternate magnetic flux produced by current i1a and i1b — the phase contrast of each alternating field, and both main—windings 43A and current i1a between auxiliary winding 43B and i1b — single—phase alternative current i1 The rotating magnetic field which rotate one time between 1 cycles arise. On the other hand, the linkage of main—winding 45A and auxiliary winding 45B of a single phase coil which are a secondary winding 45 is carried out by each [these] alternating field and rotating magnetic field, electromotive force is guided, and he is single—phase alternative current i2. It flows. Thus, the electromotive force which serves as size from the power supplied to the primary winding 43 like the case of the 1st example is guided to a secondary winding 45.

[0029] In addition, also in this example, like the case of the 1st example, a secondary winding 45 may be allotted and a primary winding 43 may be conversely allotted [a secondary winding] to a near side for a primary winding 43 and a secondary winding 45 with no distinction from a near—side side and a back side in a slot 41 again at a back side. Moreover, although the case of a lap winding was explained, you may be a wave winding or a chain winding, and although the case of a full pitch winding was explained, you may be a short pitch winding, and so to speak, you may be what kind of coil approach. Moreover, as long as it may be massive, and may carry out sinter of the ferrite, it may build [like the 1st example, may carry out the laminating of the sheet steel, may build an iron core 40, and it may roll and build it, and] it further and it consists of the magnetic substance so to speak, you may be what kind of thing.

[0030] By the way, also in a single—phase alternative current capacitor split—phase type, as explained in the modification in the 1st example, a power plant can be used as an induction motor by making it the same configuration.

[0031] In addition, while the electromotive force which consists of power which alternating field and rotating magnetic field arose like the above—mentioned single—phase alternative current capacitor split—phase type, and also supplied the rotating magnetic field by 2 phase alternating current with a 90—degree phase angle according [or] to preparing a difference in the reactance in a main winding and auxiliary winding to the primary winding size is guided to a secondary winding, without using a capacitor, it cannot be overemphasized that it can use also as an induction motor.

[3rd example—single—phase alternative current dark circles and ** coil form 2 ****] In drawing 14 , the iron core 50 consists of X character—like iron core section 50B which fitting is carried out to the centrum between both the end parts of U character—like iron core section 50A and this U character—like iron core section 50A, and is mutually combined with that U character—like iron core section 50A magnetically. While these U character—like iron core section 50A and X character—like iron core section 50B carry out the laminating of the sheet steel of the shape of the shape of U character, and an X character and being built, two cut slots 51 each where the tip side of X character—like iron core section 50B is inserted are formed in each inside in both the end parts of U character—like iron core section 50A. In this way, the iron core 50 is assembled by carrying out fitting of the X character—like iron core section 50B to the centrum between both the end parts of U character—like iron core section 50A, making each tip side of X character—like iron core section 50B insert along each cut slot 51 of U character—like iron core section 50A.

[0032] The primary winding 53 connected to the single—phase alternative current power source 52 as shown in

drawing 15 is wound around the inside Mabe section of said U character-like iron core section 50A. Moreover, it is wound around X character-like iron core section 50B so that the 1st and 2nd coils 54A and 54B which are the secondary windings 54 shown in drawing 15 may cross mutually. Furthermore, it is arranged in X character-like iron core section 50B so that the rotating magnetic field which rotate counterclockwise to the X character-like iron core section 50B in drawing 15 may arise, for example, so that the copper dark circles and the copper ** coils 55 and 56 of a pair may be illustrated.

[0033] In this way, it is the single-phase alternative current power source 52 to the single-phase alternative current i1 to a primary winding 53. When it passes, it is this single-phase alternative current i1. The operation which delays magnetic flux with alternating field, and the dark circles and the ** coils 55 and 56 of a pair by the alternate magnetic flux to produce is a single-phase alternative current i1 conjointly. The rotating magnetic field which rotate one time between 1 cycles arise. On the other hand, the linkage of the 1st and 2nd coils 54A and 54B which are secondary windings 54 is carried out by these alternating fields and rotating magnetic field, electromotive force is guided, and single-phase alternative current i2a and i2b flow. Thus, the electromotive force which serves as size from the power supplied to the primary winding 53 like the case of the 1st and 2nd examples is guided to a secondary winding 54.

[0034] In addition, although the case of the iron core 50 which consists of U character-like iron core section 50A and X character-like iron core section 50B was explained in this example drawing 16 — being shown — having — **** — as — an iron core — 50 — ' — deformation — U — a character — ** — an iron core — the section — 50 — A — ' — this — deformation — U — a character — ** — an iron core — the section — 50 — A — ' — both — an end part — between — a centrum — loosely fitting — a condition — arranging — having — circular (column) — ** — an iron core — the section — 50 — B — ' — you may constitute . Letter iron core section of these deformation of U characters 50A' and circular (column)-like iron core section 50B' carry out the laminating of the sheet steel of the letter of deformation of U characters, and a circle configuration, and are built. moreover — deformation — U — a character — ** — an iron core — the section — 50 — A — ' — inside — Mabe — the section — a primary winding — 53 — ' — winding — having — further — circular (column) — ** — an iron core — the section — 50 — B — ' — **** — a secondary winding — 54 — ' — it is — the — one — and — the — two — a coil — 54 — A — ' — 54 — B — ' — mutual — crossing — as — winding — having — **** — etc. — the above-mentioned case — being the same . In addition, while a sign 57 is an opening, signs 58 and 59 are dark circles and a ** coil.

[0035] In a place a secondary winding — 54 — 54 — ' — drawing 17 — being shown — having — **** — as — — the — one — or — the — three — a coil — 54 — A — " — 54 — B — " — 54 — C — " — constituting — — the — one — a coil — 54 — C — " — U — a character — ** — an iron core — the section — 50 — A — or — deformation — U — a character — ** — an iron core — the section — 50 — A — ' — inside — Mabe — the section — winding — having — **** — a primary winding — 53 — 53 — ' — a top — or — the bottom — winding — the — two — and — the — three — a coil — 54 — A — " — 54 — B — " — the above-mentioned — the — one — and — the — two — a coil — 54 — A — 54 — B — 54 — A — ' — 54 — B — ' — the same — X — a character — ** — an iron core — the section — 50 — B — or — circular (column) — ** — an iron core — the section — 50 — B — ' — mutual — crossing — as — winding — if — The electromotive force based on a primary winding 53 and the alternating field by 53' is efficiently guided in 1st coil 54C."

The power plant which has iron core 50' which consists of letter iron core section of deformation of U characters 50A' which is [Modification(s)], next the above-mentioned, and circular (column)-like iron core section 50B' is made into an example, and the case where this power plant is used also as an induction motor is explained.

[0036] While carrying out the laminating of the sheet steel of the letter of deformation of U characters like the above-mentioned and building the iron core 60 in drawing 18 It changes to the centrum between both the end parts of the iron core 60 of the letter of this deformation of U characters at above-mentioned circular (column)-like iron core section 50B'. it is allotted to a perpendicular condition to a drawing, both ends have the revolving shaft 61 currently supported free [rotation] through each bearing which is not illustrated, and the shape of the same axle is cylindrical to the revolving shaft 61 — the conductor 62 is arranged on the loosely-fitting condition. moreover, cylindrical, while the primary winding 63 is wound around the inside Mabe section of the iron core 60 of the letter of deformation of U characters — a conductor 62 — the — cylindrical — it is arranged so that the 1st and 2nd coils 64A and 64B which are secondary windings 64 may cross mutually, as a conductor 62 winds rotatable. In this way, an iron core 60 side is made into a stator. moreover, cylindrical — by

the rotating magnetic field produced by the primary winding 63 by using a conductor 62 side as a rotator It is the same as that of the case of the above-mentioned modification that a conductor 62 rotates. the — cylindrical — cylindrical in it being also at the electromagnetic force according to these rotating magnetic fields and induction field by the induction field based on the current guided to the front-face side of a conductor 62 — — Moreover, it is the same as that of the case of the above-mentioned [guide /to a secondary winding 64 / the electromotive force which consists of power supplied to the primary winding 63 size]. A secondary winding 64 is constituted from the 1st thru/or the 3rd coil as shown in drawing 17 . The 1st coil on a primary winding 63 or to the bottom In addition, winding, cylindrical [like the 1st and 2nd above-mentioned coils 64A and 64B] in the 2nd and 3rd coils — if it allots so that it may cross, as a conductor 62 is wound, the electromotive force based on the alternating field by the primary winding 63 will be similarly guided efficiently in the 1st coil. Others are the same as that of the above-mentioned.

[0037] In this example, although the laminating of 60 was carried out and sheet steel was built, like the 1st and 2nd examples, if it is an iron core 50, 50', and the thing that may carry out sinter of the ferrite and consists of the magnetic substance so to speak, it is what kind of thing and **** is also good [it may be massive, and].

[4th example-direct-current 2 pole concentration (all knots) volume] In drawing 19 , the iron core 70 consists of the two disc-like iron core sections 70A and 70B currently built by carrying out sinter of the ferrite. While in a circle slot 71A and (71B) are formed in the whole surface side in the shape of the same axle as these disc-like iron core sections 70A and 70B are shown in drawing 20 , through tube 72A and (72B) are formed in the axis section. by the way, in in-a-circle slot 71A of one disc-like iron core section 70A it is shown in drawing 21 — as — six SCR1-SCR6 The SUITCHI circuit 73 constituted is minded. from — Three coils 75A, 75B, and 75C which are the primary windings 75 connected to DC power supply 74 are lap windings, and it is allotted as shown to drawing 22 by the full pitch winding, and to in-a-circle slot 71A, it pastes up with resin etc. and is fixed. Moreover, in in-a-circle slot 71B of disc-like iron core section 70B of another side, three coils 76A, 76B, and 76C which are the secondary windings 76 shown in drawing 21 are lap windings similarly, and it is allotted as shown to drawing 22 by the full pitch winding, and to in-a-circle slot 71B, it pastes up with resin etc. and is fixed. in this way, both the coils 75 and 76 — the shape of sandwiches — and as it puts so that each coils 75A, 75B, 75C, 76A, 76B, and 76C which carry out phase correspondence may agree and lap, both the disc-like iron core sections 70A and 70B are made to counter mutually, a bolt 77 is inserted in both the through tubes 72A and 72B, and the iron core 70 is assembled by putting firmly on with a nut 78.

[0038] in this way, it can set from DC power supply 74 as an excitation power source in the SUITCHI circuit 73 to three coils 75A, 75B, and 75C which are primary windings 75 — each, if direct current ia1, ib1, and ic1 is intermittently passed one by one according to an on-off operation of SCR1-SCR6 The rotating magnetic field which rotate one time by round of the direct current ia1, ib1, and ic1 passed one by one with each alternating field by the alternate magnetic flux produced according to these direct current ia1, ib1, and ic1 arise. On the other hand, the linkage of the three coils 76A, 76B, and 76C which are secondary windings 76 is carried out to these alternating fields and rotating magnetic field, the electromotive force by each alternating field and rotating magnetic field is guided to each [these] coils 76A, 76B, and 76C, after the phase has shifted mutually, and direct current ia2, ib2, and ic2 flows intermittently. Thus, the electromotive force which serves as size from the power supplied to the primary winding 75 is guided to a secondary winding 76.

The power plant of [Modification(s)], next the above-mentioned direct-current 2 pole concentration (all knots) volume is made into an example, and the case where this power plant is used as an induction motor is explained.

[0039] In drawing 23 and drawing 24 , a laminating is carried out to a top face up and down, it is fixed to it, and the primary winding 81 and secondary winding 82 which are arranged in the shape of a circular ring as mentioned above are prepared in it, for example, the circle configuration low wall section 83 as an iron core currently built by carrying out sinter of the ferrite is fixed on the lower limit side of the stator frame 80 of the shape of a cylindrical shape which has a upper wall. These primary windings 81 and a secondary winding 82 consist of three coils each, and are arranged as above-mentioned by the direct-current 2 pole concentrated winding.

[0040] by the way, in the centrum of the circular ring-like primary winding 81 and a secondary winding 82, it has the revolving shaft 88 currently supported free [rotation] through each bearings 86 and 87 by each holes 84 and 85 which are located in the axis of rotating magnetic field and prepared in the upper wall of the stator frame 80, and the circle configuration low wall section 83 — disc-like — a conductor 89 is arranged between the upper wall of the stator frame 80, and a primary winding 81, and is prepared. in this way, disc-like [make a

primary-winding 81 and secondary-winding 82 side into a stator and] — the rotating magnetic field produced by the primary winding 81 by using a conductor 89 side as a rotator — the — disc-like — disc-like [like the above-mentioned modification] based on the current which flows to the front-face side of a conductor 89 — the power supplied to the secondary winding 82 as mentioned above at the primary winding 81 while the conductor 89 rotated — size — electromotive force is guided.
[0041] in addition, a primary-winding 81 and secondary-winding 82 side is made into a stator, and disc-like in this example, — although the conductor 89 side was used as the rotator — a primary-winding 81 side and a secondary-winding 82 side — a rotator — disc-like — it is good also considering a conductor 89 side as a stator.
[0042] In this example, although primary windings 75 and 81 were arranged in the bottom and secondary windings 76 and 82 were arranged in the bottom, primary windings 75 and 81 may be arranged in the bottom, and secondary windings 76 and 82 may be arranged in the bottom. Moreover, although the lap winding was explained like each above-mentioned example, you may be a wave winding or a chain winding, and although the case of a full pitch winding was explained, you may be a short pitch winding, and so to speak, you may be what kind of coil approach including a distributed winding.
[0043] In this example, although an iron core 70 and the circle configuration low wall section 83 carry out sinter of the ferrite and it is built, as long as it consists of the magnetic substance, what kind of thing may be used.
[5th example-3 phase alternating current single phase (all knots) volume] In drawing 25 an iron core 90 At equal intervals to an inferior-surface-of-tongue side at a longitudinal direction And 1st iron core section 90A by which the slot 91 is perpendicularly formed to the drawing, It consists of that 2nd [which is regular intervals] iron core section 90B by which the cut slot 93 where the tip side of the lobe 92 between the slots 91 of 1st iron core section 90A is inserted is perpendicularly formed to the drawing is mutually combined with a longitudinal direction magnetically at a top-face side. These [1st] and the 2nd iron core section 90A and 90B are carrying out the laminating of the sheet steel, or carry out sinter of the ferrite and are built. In this way, the iron core 90 is assembled by making the lobe 92 of 1st iron core section 90A insert in the cut slot 93 of 2nd iron core section 90B.
[0044]
[Equation 2]
前記第１の鉄心部９０Ａのスロット９１内における奥側には、図示されていない三相交流電源に接続されている一次巻線９４であるＵ１相巻線９４Ａ，Ｖ１相巻線９４ＢおよびＷ１相巻線９４Ｃが図２６（ａ）に示されているように順次に配され嵌入されている。また、スロット９１内における手前側には、図２６（ｂ）に示されている二次巻線９５であるＵ２相巻線９５Ａ，Ｖ２相巻線９５ＢおよびＷ２相巻線９５Ｃが同様に順次に配されて嵌入されている。なお、図２５，図２６（ａ），（ｂ）における符号①～⑩はスロット番号を示している。

[0045] In this way, if the balanced three-phase-alternating-current currents ia1, ib1, and ic1 are passed as an exciting current from the three-phase-alternating-current power source which is not illustrated by U plane 1 coil 94A which is a primary winding 94, V plane 1 coil 94B, and W plane 1 coil 94C, each alternating field 96 and the travelling magnetic field 97 which progresses in the direction of an arrow head currently illustrated will arise as shown to drawing 25 by the alternate magnetic flux produced according to these balance three-phase-alternating-current currents ia1, ib1, and ic1. In addition, the alternating field 96 in drawing 25 etc. show the time of the current ia1 flowing to U plane 1 coil 94A at max among the three layer alternating current ia1, ib1, and ic1 of balances. The balanced three-phase-alternating-current currents ia2, ib2, and ic2 flow as the electromotive force which consists of power supplied to U2 phase-winding 95A and V2 phase-winding 95B and W2 phase-winding 95C which is a secondary winding 95 as mentioned above on the other hand at the primary winding 94 by each [these] alternating field 96 and the travelling magnetic field 97 size is guided and it is shown in drawing 26 (b).
The power plant of [Modification(s)], next the above-mentioned three-phase-alternating-current single phase (all knots) volume is made into an example, and the case where it uses also as the so-called linear motor is explained by using this power plant as an induction motor.
[0046] While carrying out the laminating of the sheet steel like the above-mentioned in drawing 27 , or carrying out sinter of the ferrite and building the iron core 100 as the upstream, the slot 101 is formed in the longitudinal

direction at equal intervals at the inferior-surface-of-tongue side of this iron core 100. U plane 1 coil 102A which is a primary winding 102 as mentioned above, V plane 1 coil 102B, and W plane 1 coil 102C are allotted one by one, and are inserted in the back side within this slot 101. Moreover, U2 phase-winding 103A and V2 phase-winding 103B and W2 phase-winding 103C which is a secondary winding 103 similarly is allotted to the near side within a slot 101 one by one, and is inserted in it.

[0047] on the other hand, the iron core 100 is met at the lower part side of an iron core 100 — as — the conductor as secondary — the plate 104 is arranged. in this way, an iron core 100 side — a fixed side — carrying out — a conductor — the travelling magnetic field which progresses in the direction of an arrow head which produces a plate 104 side by the movable side, then the primary winding 102, and which is illustrated — a conductor — it is also at the electromagnetic force according to these travelling magnetic fields and induction field by the induction field based on the current guided to the front-face side of a plate 104 — a conductor — a plate 104 moves in the direction of an arrow head. Moreover, it is the same as that of the case of the above-mentioned [guide /to a secondary winding 103 /the electromotive force which consists of power supplied to the primary winding 102 size].

[0048] in addition, the above-mentioned — setting — an iron core 100 side — a fixed side — carrying out — a conductor — although the plate 104 side was used as the movable side — an iron core 100 side — a movable side and a conductor — it is good also considering a plate 104 as a fixed side. In this example, although the single phase volume of the three-phase alternating current explained the case of a full pitch winding, you may be a two phase volume, a lap winding and a wave winding or a chain winding, and also a short pitch winding, and so to speak, you may be what kind of coil approach.

[0049] Although it set to this example and the secondary winding 95,103 was allotted to the back [primary winding /94,102] side within a slot 91,101 at the near side, a secondary winding 95,103 may be allotted to a back side again, and a primary winding 94,102 may be allotted to a near side with no distinction from a near-side side and a back side.

[0050] In this example, although an iron core 90,100 carries out the laminating of the sheet steel, or sinter of the ferrite is carried out and it is built, as long as it consists of the magnetic substance, you may be what kind of thing.

[0051] If a part of electromotive force [at least] guided to a secondary winding in each above-mentioned example and each above-mentioned modification is supplied to a primary winding, it has a function also as self generating and also an induction motor, and a linear motor, without needing supply of the electrical energy from the outside except for the time of early starting. Moreover, it cannot be overemphasized that the period of the current which flows to a primary winding is shortened, and size, then the electromotive force guided to a secondary winding as the source resultant pulse number of a polyphase volume increases again serve as size in the number of alternation of alternating field and the rotational frequency of rotating magnetic field. Moreover, the shifting magnetic field which move to the others and the cross direction which are the above-mentioned rotating magnetic field etc. reversibly shall also be included in a travelling magnetic field.

[0052] as explained above, various this inventions can be alike and it can change are clear. Such all deformation clear for this contractor and modification are included in a claim, without such modification being contrary to the pneuma and the range of this invention.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] Drawing 1 is a cross-section perspective view for explaining the 1st example of the power plant by this invention.
[Drawing 2] Drawing 2 is a cross-sectional view for explaining the 1st example of the power plant by this invention.
[Drawing 3] Drawing 3 (a), (b), and (c) are the circuit diagrams and coil Figs. for explaining the 1st example of the power plant by this invention.
[Drawing 4] Drawing 4 is the generating Fig. of the rotating magnetic field for explaining the 1st example of the power plant by this invention.
[Drawing 5] Drawing 5 (a), (b), and (c) are the coil Figs. corresponding to the cross-sectional view corresponding to drawing 2 of the example of the 1st mode in the 1st example of the power plant by this invention and drawing 3 (b), and (c).
[Drawing 6] Drawing 6 is the generating Fig. of the rotating magnetic field of the example of the 1st mode in the 1st example of the power plant by this invention.
[Drawing 7] Drawing 7 (a), (b), and (c) are the coil Figs. corresponding to the cross-sectional view corresponding to drawing 2 of the example of the 2nd mode in the 1st example of the power plant by this invention and drawing 3 (b), and (c).
[Drawing 8] Drawing 8 is drawing of longitudinal section of the 1st modification in the case of using the power plant of the 1st example also as an induction motor.
[Drawing 9] Drawing 8 is the cross-sectional view of the 1st modification in the case of using the power plant of the 1st example also as an induction motor.
[Drawing 10] Drawing 10 is drawing of longitudinal section of the 2nd modification in the case of using the power plant of the 1st example also as an induction motor.
[Drawing 11] Drawing 11 is the cross-sectional view of the 2nd modification in the case of using the power plant of the 1st example also as an induction motor.
[Drawing 12] Drawing 12 (a), (b), and (c) are the coil Figs. corresponding to the cross-sectional view corresponding to drawing 2 for explaining the 2nd example of the power plant by this invention and drawing 3 (b), and (c).
[Drawing 13] Drawing 13 is a circuit diagram for explaining the 2nd example of the power plant by this invention.

[Drawing 14] Drawing 14 is a flat-surface external view for explaining the 3rd example of the power plant by this invention.
[Drawing 15] Drawing 15 is a circuit diagram for explaining the 3rd example of the power plant by this invention.
[Drawing 16] Drawing 16 is the flat-surface external view of the example of the 1st mode in the 3rd example of the power plant by this invention.
[Drawing 17] Drawing 17 is the circuit diagram of the example of the 2nd mode in the 3rd example of the power plant by this invention.
[Drawing 18] Drawing 18 is a flat-surface external view as a modification corresponding to the example of the 1st mode in the case of using the power plant of the 3rd example also as an induction motor.
[Drawing 19] Drawing 19 is drawing of longitudinal section for explaining the 4th example of the power plant by this invention.
[Drawing 20] Drawing 20 is the perspective view of the iron core section for explaining the 4th example of the

power plant by this invention.
[Drawing 21] Drawing 21 is a circuit diagram for explaining the 4th example of the power plant by this invention.
[Drawing 22] Drawing 22 is a coil plot plan for explaining the 4th example of the power plant by this invention.
[Drawing 23] Drawing 23 is drawing of longitudinal section for explaining the modification in the case of using the power plant of the 4th example also as an induction motor.
[Drawing 24] Drawing 24 is a cross-sectional view in line A-A' in drawing 23 .
[Drawing 25] Drawing 25 is a cross-sectional view corresponding to drawing 2 for explaining the 5th example of the power plant by this invention.
[Drawing 26] Drawing 26 (a) and (b) are the coil Figs. corresponding to drawing 3 (b) for explaining the 5th example of the power plant by this invention, and (c).
[Drawing 27] Drawing 27 is drawing of longitudinal section in the case of using the power plant of the 5th example also as a linear motor.
[Description of Notations]
ten — ten — ' — ten — " — 21 — 21 — ' — 40 — 50 — 50 — ' — 60 — 70 — 90,100 — Iron core
41 11, 11', 11", 22, 22', 91,101 Slots 12 and 92 Lobe
13, 51, 93 Cut slot
14 Three-phase-Alternating-Current Power Source
15 — 15 — ' — 15 — " — 23 — 43 — 53 — 53 — ' — 63 — 75 — 81 — 94,102 — Primary winding
16, 16', 16", 24, 45, 54, 64, 76, 82, 95,103 Secondary winding
17, 17', 96 Alternating field
18, 18', 97 Rotating magnetic field
20, 20', 80 Stator frame
25, 26, 84, 85 Hole
27, 28, 86, 87 Bearing
61 29, 29', 88 Revolving shaft
30 and 62 cylindrical — conductor
30' circular ring tubed — conductor
42 52 Monolayer AC power supply
44 46 Capacitor
55, 56, 58, 59 Dark-circles **** coil
57 Opening
73 Switching Circuit
74 DC Power Supply
77 Bolt
78 Nut
83 Circular Pillar-shaped Low Wall Section
89 Disc-like — Conductor
104 Conductor — Plate

[Translation done.]

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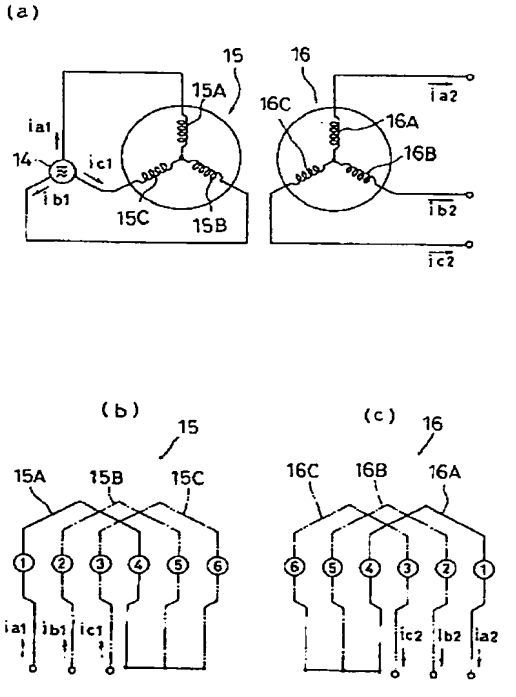
(54)【発明の名称】　発電装置

(57)【要約】
【目的】　自然環境を破壊することなくかつ安定して電気エネルギーを供給することができ、しかもコンパクト化が可能な発電装置を提供することを目的とする。
【構成】　交番磁界に加えて進行磁界を生じさせる一次巻線と、この一次巻線により生ずる交番磁界および進行磁界に鎖交するように配される二次巻線とを具える構成とする。



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【特許請求の範囲】

【請求項１】　交番磁界に加えて進行磁界を生じさせる一次巻線と、この一次巻線により生ずる交番磁界および進行磁界に鎖交するように配される二次巻線とを具えることを特徴とする発電装置。

【請求項２】　前記二次巻線に誘導される起電力の少なくとも一部を前記一次巻線に供給することを特徴とする請求項１に記載の発電装置。

【請求項３】　前記一次巻線により生じる交番磁界および進行磁界は、直流，単相交流，二相交流，または三相交流を含む多相交流より生じることを特徴とする請求項１または２に記載の発電装置。

【請求項４】　前記一次巻線および二次巻線は、同一磁気回路に配設されることを特徴とする請求項１または２に記載の発電装置。

【請求項５】　前記一次巻線および二次巻線の巻数比によって、この二次巻線に誘導される起電力の電圧・電流を調節することを特徴とする請求項１または２に記載の発電装置。

【請求項６】　前記一次巻線および二次巻線を一次側とし、前記進行磁界により誘導される電流にもとづき前記一次側に対して相対的に移動される二次側を設けることを特徴とする請求項１または２に記載の発電装置。

【請求項７】　前記進行磁界は、回転磁界であることを特徴とする請求項１に記載の発電装置。

【請求項８】　前記一次巻線により生じる交番磁界および回転磁界は、直流，単相交流，二相交流，または三相交流を含む多相交流により生じることを特徴とする請求項７に記載の発電装置。

【請求項９】　前記一次巻線は、三相を含む多相の対称巻でかつ４極巻を含む多極巻であることを特徴とする請求項７に記載の発電装置。

【請求項１０】　前記直流，単相交流，二相交流，または三相交流を含む多相交流によって生じる交番磁界の交番数および回転磁界の回転数を大とすることを特徴とする請求項８に記載の発電装置。

【請求項１１】　前記二次巻線は、前記一次巻線と同相数の対称巻であることを特徴とする請求項９に記載の発電装置。

【請求項１２】　前記多相交流の周期を短くして前記交番磁界の交番数および回転磁界の回転数を大とすることを特徴とする請求項９に記載の発電装置。

【請求項１３】　前記一次巻線および二次巻線は、同一磁気回路に配設されることを特徴とする請求項１１に記載の発電装置。

【請求項１４】　前記一次巻線および二次巻線の各対応する巻線部分は、前記同一磁気回路を構成する鉄心に近接して配設されることを特徴とする請求項１３に記載の発電装置。

【請求項１５】　前記回転磁界の回転軸芯に回転軸を有して前記一次巻線および二次巻線側を固定子としその回転磁界により誘導される電流にもとづき回転駆動される回転子を設けることを特徴とする請求項７乃至１４のうちのいずれかに記載の発電装置。

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【請求項１６】　前記一次巻線および二次巻線側を前記回転磁界の回転軸芯に回転軸を有する回転子とし、この回転子を前記回転磁界により誘導される電流にもとづき回転駆動させる固定子を設けることを特徴とする請求項７乃至１４のうちのいずれかに記載の発電装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、発電装置に関し、より詳しくは自己発電により電気エネルギーを、例えば変換器，負荷回路などに供給する電気エネルギー源としての発電装置に関するものである。

【０００２】

【従来の技術】従来、この種の発電装置としては、次のようなものがある。

ａ）高い所にある水の落下エネルギーを利用して電気エネルギーを生じさせる水力発電装置。

ｂ）石炭、重油、可燃ガスのような燃料の熱エネルギーを利用して電気エネルギーを生じさせる火力発電装置。

ｃ）核分裂の過程の反応のよる放出エネルギーを利用して電気エネルギーを生じさせる原子力発電装置。

ｄ）太陽熱エネルギーまたは太陽光エネルギーの太陽エネルギーを利用して電気エネルギーを生じさせる太陽発電装置。

ｅ）風力エネルギーを利用して電気エネルギーを生じさせる風力発電装置。

ｆ）低エネルギー含量の生成物を与える化学反応が起こることにもとづく化学エネルギーを利用して電気エネルギーを生じさせる化学発電装置、いわゆる電池。

【０００３】

【発明が解決しようとする課題】しかしながら、前述された各発電装置においては、次のような問題点がある。水力発電装置にはダム建設による自然環境上の、また火力発電装置には二酸化炭素，NO_x，SO_xのような排気ガスによる大気汚染にもとづく自然環境上の、更には原子力発電装置には核事故および核廃棄物による自然環境上の、加えて電池には化学反応に用いる水銀，ニッケル，カドニウムなどの重金属の廃棄処理にもとづく自然環境上の問題点がある。

【０００４】一方、太陽発電装置および風力発電装置は、自然環境には悪影響を与えないが、太陽発電装置では年間において利用できる日数が制限されるために、また風力発電装置では風力エネルギーの間欠性のために電気エネルギーの安定供給上の問題点がある。

【０００５】本発明は、このような問題点を解決することを目的して、自然環境を破壊することなくかつ安定して電気エネルギーを供給することができ、しかもコンパ

クト化が可能な新規な原理にもとづく発電装置を提供することにある。

【０００６】

【課題を解決するための手段および作用・効果】本発明による発電装置は、前述された目的を達成するために、交番磁界に加えて進行磁界を生じさせる一次巻線と、この一次巻線により生じる交番磁界および進行磁界に鎖交するように配される二次巻線とを具えることである。

【０００７】このように構成すれば、一次巻線に流れる励磁電流による交番磁束によって生じる交番磁界および進行磁界により、二次巻線にはその交番磁界による起電力と、更にはその進行磁界による起電力とが誘導される。しかも、交番磁界にもとづき二次巻線に誘導される起電力は、一次巻線に励磁電流を流すために供給された電力から銅損、鉄損などの若干の損失を差引いたものとほぼ等しくなることから、二次巻線には回転磁界にもとづき誘導される起電力とも相俟って一次巻線に供給された電力よりも大なる起電力が誘導され、自己発電が行われる。

【０００８】したがって、自然環境を破壊することなくかつ安定して電気エネルギーを供給することができ、しかもコンパクト化が可能である。前記二次巻線に誘導される起電力の少なくとも一部を前記一次巻線に供給するように構成すれば、初期の始動時を除き外部からの電気エネルギーの供給を必要とすることなく自己発電が行われる。

【０００９】なお、前記一次巻線により生じる交番磁界、および回転磁界含む進行磁界は、直流，単相交流，二相交流，または三相交流を含む多相交流より生じ得る。ところで、前記進行磁界が例えば回転磁界であるとして、前記直流，単相交流，二相交流，または三相交流を含む多相交流によって生じる交番磁界の交番数および回転磁界の回転数を、例えば直流の場合は断続的に流す直流の周期を短くして、また単相交流，二相交流および多相交流の場合はその交流の周期を短くして大とすれば、前記二次巻線に誘導される起電力が大となる。また、前記一次巻線が、三相を含む多相の対称巻でかつ４極巻を含む多極巻であるように構成すれば、多相巻の相数および多極巻の極数が増すにつれて前記二次巻線に誘導される起電力が大となる。なお、この場合に前記二次巻線は、前記一次巻線と同相数の対称巻であることが好ましい。なお、進行磁界が回転磁界と異なる場合も同様のことが言える。

【００１０】また、前記二次巻線に誘導される起電力の電圧・電流は、前記一次巻線および二次巻線の巻数比によって調節することが好ましい。なお、前記一次巻線および二次巻線は同一磁気回路に配設され、更には前記一次巻線および二次巻線の各対応する巻線部分が前記同一磁気回路を構成する鉄心に近接して配設されることが好ましい。

【００１１】なお、前記回転磁界の回転軸芯に回転軸を有して前記一次巻線および二次巻線側を固定子としその回転磁界により誘導される電流にもとづき回転駆動される回転子を設けるように、または前記一次巻線および二次巻線側を前記回転磁界の回転軸芯に回転軸を有する回転子とし、この回転子を前記回転磁界により誘導される電流にもとづき回転駆動させる固定子を設けるように構成すれば、発電装置に加えて誘導電動機としても用いることができる。また、前記一次巻線および二次巻線を一次側とし、前記進行磁界により誘導される電流にもとづき前記一次側に対して相対的に移動される二次側を設けるように構成すれば、発電装置に加えてリニアモータとしても用いることができる。

【００１２】本発明によれば、自然環境を破壊することなくかつ安定して電気エネルギーを供給し得る自己発電ができ、しかも初期の始動時を除き外部からの電気エネルギーの供給を必要とすることなく自己発電が行い得る。したがって、従来の水力発電装置，火力発電装置，原子力発電装置，太陽発電装置，風力発電装置、電池などに替わって電気エネルギーを供給することができることは勿論、特にその電気エネルギーでもってモータを駆動させているような民生用を含め全ての電気機器において極めて有用である。

【００１３】本発明の他の目的は、後述される詳細な説明から明らかにされる。しかしながら、詳細な説明および具体的実施例は最も好ましい実施態様について説明するが、本発明の精神および範囲内の種々の変更および変形はその詳細な説明から当業者にとって明らかであることから、具体的例としてのみ述べるものである。

【００１４】

【実施例】次に、本発明による発電装置の具体的各実施例につき順次に図面を参照しつつ説明する。

〔第１実施例－三相交流２極集中（全節）巻〕図１および図２において、鉄心１０は、円柱状鉄心部１０Ａと、この円柱状鉄心部１０Ａがその中空部に嵌合されその円柱状鉄心部１０Ａと互いに磁気的に結合される円環筒状鉄心部１０Ｂとより構成されている。この円柱状鉄心部１０Ａは、円形状薄鋼板を積層して造られているとともに、外周面側には周方向に等間隔にかつその軸線方向に沿う６個のスロット１１が形成されている。また、円環筒状鉄心部１０Ｂは、同様に円環状薄鋼板を積層して造られているとともに、内周面側には周方向に等間隔にかつその軸線方向に沿い円柱状鉄心部１０Ａのスロット１１間における突出部１２の先端側が嵌入される６個の切込溝１３が形成されている。こうして、円柱状鉄心部１０Ａの突出部１２を円環筒状鉄心１０Ｂの切込溝１３に沿って嵌入させながら円環筒状鉄心部１０Ｂの中空部に円柱状鉄心部１０Ａを嵌合させることで鉄心１０が組立られている。

【００１５】前記円柱状鉄心部１０Ａのスロット１１内

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における奥側には、図３（ａ）に示されているように三相交流電源１４に接続されている一次巻線１５であるＵ１相巻線１５Ａ，Ｖ１相巻線１５ＢおよびＷ１相巻線１５ＣがＹ結線の三相対称巻でもって図３（ｂ）に示されているように配され嵌入されている。また、スロット１１内における手前側には、図３（ａ）に示されている二次巻線１６であるＵ２相巻線１６Ａ，Ｖ２相巻線１６ＢおよびＷ２相巻線１６Ｃが同様にＹ結線の三相対称巻でもって図３（ｃ）に示されているように配され嵌入されている。なお、図２および図３（ｂ），（ｃ）における符号①～⑥はスロット番号を示している。

【００１６】こうして、一次巻線１５であるＵ１相巻線１５Ａ，Ｖ１相巻線１５ＢおよびＷ１相巻線１５Ｃに三相交流電源１４から励磁電流として平衡三相交流i_{a1}，i_{b1}，i_{c1}を流すと、これら平衡三相交流i_{a1}，i_{b1}，i_{c1}によって生じる交番磁束により図４に示されているように各交番磁界１７と、平衡三相交流i_{a1}，i_{b1}，i_{c1}の１サイクルの間に時計方向に１回転する進行磁界の一種である回転磁界１８とが生じる。一方、これら各交番磁界１７および回転磁界１８に二次巻線１６であるＵ２相巻線１６Ａ，Ｖ２相巻線１６ＢおよびＷ２相巻線１６Ｃが鎖交され、これらＵ２相巻線１６Ａ，Ｖ２相巻線１６ＢおよびＷ２相巻線１６Ｃには各交番磁界１７および回転磁界１８による起電力が誘導されて図３（ａ），（ｃ）に示されているように平衡三相交流i_{a2}，i_{b2}，i_{c2}が流れる。

【００１７】このように、二次巻線１６に誘導される起電力は、一次巻線１５による交番磁界１７、更には回転磁界１８による誘導起電力が相加わり、しかも交番磁界１７にもとづき二次巻線１６に誘導される起電力は一次＊巻線１５に流した平衡三相交流i_{a1}，i_{b1}，i_{c1}の電力から銅損、鉄損などの若干の損失を差引いたものとほぼ等しくなることから、一次巻線１５に供給した電力よりも大となって自己発電が行われる。

【００１８】なお、本実施例においては２極集中（全節）巻の場合について説明したが、２倍の個数のスロット１１’にしてそれらスロット１１’に図５（ａ），（ｂ），（ｃ）に示されているように例えば重ね巻で一次巻線１５’であるＵ１相巻線１５Ａ’，Ｖ１相巻線１５Ｂ’およびＷ１相巻線１５Ｃ’と二次巻線１６’であるＵ２相巻線１６Ａ’，Ｖ２相巻線１６Ｂ’およびＷ２相巻線１６Ｃ’とを配すれば４極集中（全節）巻となり、図６に示されているように４極回転磁界１８’を生じ、平衡三相交流i_{a1}，i_{b1}，i_{c1}の２サイクルの間に時計方向に１回転する。同様にして６極以上の回転磁界を得ることができる。このように回転磁界を多極にすれば、多極にすればする程二次巻線１６，１６’に誘導される起電力は大となる。

【００１９】本実施例においては集中（全節）巻の場合を説明したが分布（全節）巻の場合には、例えば４極分布（全節）巻においては３６個のスロット１１”に図７（ａ），（ｂ），（ｃ）に示されているように例えば重ね巻で一次巻線１５”であるＵ１相巻線１５Ａ”，Ｖ１相巻線１５Ｂ”およびＷ１相巻線１５Ｃ”、更には二次巻線１６”であるＵ２相巻線１６Ａ”，Ｖ２相巻線１６Ｂ”およびＷ２相巻線１６Ｃ”を配すれば良い。他は、前述と同様である。

【００２０】

【数１】

なお、図５（ａ），（ｂ），（ｃ）および図７（ａ），（ｂ），（ｃ）における符号①～⑫，①～㊱は、同様にスロット番号を示している。

【００２１】〔変形例〕次に、前述の三相交流４極分布（全節）巻の発電装置を例にして、この発電装置を誘導電動機としても用いる場合について説明する。

【００２２】図８および図９において、上下壁を有する円筒形状の固定子枠２０内に同軸状にその固定子枠２０に固定されて円環筒状鉄心２１が設けられている。この円環筒状鉄心２１の内周面側には、周方向に等間隔にかつその軸線方向に沿って３６個のスロット２２が形成されている。これらスロット２２内における奥側に一次巻線２３を配し、手前側に二次巻線２４を配して前述の通りに三相交流４極分布（全節）巻の三相対称巻でかつ重ね巻でそれら一次巻線２３および二次巻線２４が配設されている。

【００２３】ところで、円環筒状鉄心２１内の中空部には、回転磁界の軸芯に位置して固定子枠２０の上下壁に設けられている各孔２５，２６に各ベアリング２７，２８を介して回転自在に支持されている回転軸２９を有する円柱状導体３０が設けられている。こうして、円環筒状鉄心２１側を固定子とし、また円柱状導体３０側を回転子として一次巻線２３により生ずる回転磁界によってその円柱状導体３０の表面側に誘導される電流にもとづく誘導磁界によりそれら回転磁界と誘導磁界とによる電磁力でもって回転子としての円柱状導体３０が回転される。なお、二次巻線２４には前述の通りに一次巻線２３に供給した電力よりも大なる起電力が誘導されることは言うまでもない。

【００２４】また、図１０および図１１に示されているように、円筒形状の固定子枠２０’内に同軸状にその固定子枠２０’の下壁に固定される円環筒状鉄心２１’を設け、この円環筒状鉄心２１’の外周面と固定子枠２０’の内周面との間の円環筒状空間に遊嵌される円環筒状導体３０’を設けるようにしても良い。この場合に、円環筒状鉄心２１’の外周面側にスロット２２’が形成される他は円環筒状導体３０’の回転軸２９’が円環筒状鉄心２１’の中空部において回転磁界の軸芯に位置されるなどは前述と同様である。

【００２５】なお、３相交流４極分布（全節）巻の場合を例にして説明したが、前述の３相交流２極集中（全節）巻、４極集中（全節）であっても良いことは言うまでもない。また、円環筒状鉄心２１，２１'側を固定子とし、円柱状導体３０，円環筒状導体３０'側を回転子として説明したが、円環筒状鉄心２１，２１'に回転軸を有させてその円環筒状鉄心２１，２１'側を回転子とし、円柱状導体３０，円環筒状導体３０'側を固定子としても良い。

【００２６】本実施例においては、スロット１１，１１'，１１"，２２，２２'内における奥側に一次巻線１５，１５'，１５"，２３を配し、手前側に二次巻線１６，１６'，１６"，２４を配したが、逆に一次巻線１５，１５'，１５"，２３を手前側に二次巻線１６，１６'，１６"，２４を奥側に配しても良く、一次巻線１５，１５'，１５"，２３および二次巻線１６，１６'，１６"，２４を手前側，奥側に区別なく配しても良い。また、Ｙ結線の三相対称巻の場合について説明したが△結線の三相対称巻であっても良い。さらに、重ね巻の場合について説明したが波巻または鎖巻であっても良く、また全節巻の場合について説明したが短節巻であっても良く、言うなれば如何なる巻線方法であっても良い。

【００２７】本実施例においては、鉄心１０，１０'，１０"，２１，２１'を薄鋼板を積層して造ったが、巻いて造っても良く、塊状であっても良く、フェライトを焼固して造っても良く、言うなれば磁性体で構成されるものであれば如何なるものであっても良い。

〔第２実施例－単相交流コンデンサ分相形４極分布（全節）巻〕図１２（ａ），（ｂ），（ｃ）において、鉄心４０は、第１実施例の場合と同様に円柱状鉄心部４０Ａと、この円柱状鉄心部４０Ａがその中空部に嵌合されその円柱状鉄心部４０Ａと互いに磁気的に結合される円環筒状鉄心部４０Ｂとより構成されている。この円柱状鉄心部４０Ａの外周面側に周方向に等間隔にかつその軸線方向に沿って形成されている１６個のスロット４１内における奥側には、図１３において示されているように単相交流電源４２に接続されている一次巻線４３である単相巻線の主巻線４３Ａとコンデンサ４４を有する補助巻線４３Ｂとが２相対称巻、重ね巻かつ全節巻でもって図示されているように両主巻線４３Ａおよび補助巻線４３Ｂ間に電気的に９０°の位相角があるようにして配され嵌入されている。また、スロット４１内における手前側には、図１３に示されている二次巻線４５である単相巻線の主巻線４５Ａとコンデンサ４６を有する補助巻線４５Ｂとが同様に二相対称巻，重ね巻かつ全節巻でもって両主巻線４５Ａおよび補助巻線４５Ｂに電気的に９０°の位相角があるように配され嵌入されている。

【００２８】こうして、一次巻線４３に単相交流電源４２から励磁電源として単相交流i_1を流すと主巻線４３Ａおよび補助巻線４３Ｂに流れる各電流i_{1a}，i_{1b}によって生じる交番磁束により各交番磁界と、両主巻線４３Ａおよび補助巻線４３Ｂ間の電流i_{1a}，i_{1b}の位相差により単相交流i_1の１サイクル間に１回転する回転磁界が生じる。一方、これら各交番磁界および回転磁界により二次巻線４５である単相巻線の主巻線４５Ａおよび補助巻線４５Ｂが鎖交され、起電力が誘導されて単相交流i_2が流れる。このようにして、第１実施例の場合と同様に一次巻線４３に供給した電力よりも大となる起電力が二次巻線４５に誘導される。

【００２９】なお、本実施例においても、第１実施例の場合と同様に、一次巻線４３および二次巻線４５をスロット４１内において、逆に一次巻線４３を手前側に、また二次巻線４５を奥側に配しても良く、手前側，奥側に区別なく配しても良い。また、重ね巻の場合について説明したが波巻または鎖巻であっても良く、また全節巻の場合について説明したが短節巻であっても良く、言うなれば如何なる巻線方法であっても良い。また、鉄心４０を、第１実施例と同様に薄鋼板を積層して造っても良く、巻いて造っても良く、また塊状であっても良く、更にはフェライトを焼固して造っても良く、言うなれば磁性体で構成されるものであれば如何なるものであっても良い。

【００３０】ところで、単相交流コンデンサ分相形においても、第１実施例における変形例において説明したように、同様の構成にすることにより発電装置を誘導電動機として用いることができる。

【００３１】なお、コンデンサを用いずに主巻線および補助巻線におけるリアクタンスに差を設けることによる、あるいは９０°の位相角がある２相交流による回転磁界も前述の単相交流コンデンサ分相形と同じように交番磁界および回転磁界が生じ、一次巻線に供給した電力よりも大なる起電力が二次巻線に誘導されるとともに、誘導電動機としても用いることができることは言うまでもない。

〔第３実施例－単相交流くまとりコイル形２極巻〕図１４において、鉄心５０は、Ｕ字状鉄心部５０Ａと、このＵ字状鉄心部５０Ａの両端辺部間の中空部に嵌合されてそのＵ字状鉄心部５０Ａと互いに磁気的に結合されるＸ字状鉄心部５０Ｂとより構成されている。これらＵ字状鉄心部５０Ａおよびｘ字状鉄心部５０Ｂは、Ｕ字状およびＸ字状の薄鋼板を積層して造られているとともに、Ｕ字状鉄心部５０Ａの両端辺部における各内側にはＸ字状鉄心部５０Ｂの先端側が嵌入される各２個の切込溝５１が形成されている。こうして、Ｘ字状鉄心部５０Ｂの各先端側をＵ字状鉄心部５０Ａの各切込溝５１に沿って嵌入させながらＵ字状鉄心部５０Ａの両端辺部間の中空部にＸ字状鉄心部５０Ｂを嵌合させることで鉄心５０が組立てられている。

【００３２】前記Ｕ字状鉄心部５０Ａの中間辺部には図

１５に示されているように単相交流電源５２に接続されている一次巻線５３が巻回されている。また、Ｘ字状鉄心部５０Ｂには、図１５に示されている二次巻線５４である第１および第２の巻線５４Ａ，５４Ｂが互いに交差するように巻回されている。さらに、Ｘ字状鉄心部５０Ｂには、図１５においてそのＸ字状鉄心部５０Ｂに反時計方向に回転する回転磁界が生じるように、例えば銅製の一対のくまとりコイル５５，５６が図示されるように配設されている。

【００３３】こうして、一次巻線５３に単相交流電源５２から単相交流 i_1 を流すと、この単相交流 i_1 によって生じる交番磁束により交番磁界と、一対のくまとりコイル５５，５６による磁束を遅らす作用とが相俟って単相交流 i_1 の１サイクル間に１回転する回転磁界が生じる。一方、これら交番磁界および回転磁界により二次巻線５４である第１および第２の巻線５４Ａ，５４Ｂが鎖交され、起電力が誘導されて単相交流 i_{2a}，i_{2b} が流れる。このようにして、第１および第２実施例の場合と同様に一次巻線５３に供給した電力よりも大となる起電力が二次巻線５４に誘導される。

【００３４】なお、本実施例においては、Ｕ字状鉄心部５０ＡおよびＸ字状鉄心部５０Ｂより構成されている鉄心５０の場合について説明したが、図１６に示されているように鉄心５０’を変形Ｕ字状鉄心部５０Ａ’と、この変形Ｕ字状鉄心部５０Ａ’の両端辺部間の中空部に遊嵌状態に配設される円形（柱）状鉄心部５０Ｂ’とより構成しても良い。これら変形Ｕ字状鉄心部５０Ａ’および円形（柱）状鉄心部５０Ｂ’は変形Ｕ字状および円形状の薄鋼板を積層して造られ、また変形Ｕ字状鉄心部５０Ａ’の中間辺部に一次巻線５３’が巻回され、更には円形（柱）状鉄心部５０Ｂ’には二次巻線５４’である第１および第２の巻線５４Ａ’，５４Ｂ’が互いに交差するように巻回されているなどは、前述の場合と同様である。なお、符号５７は空隙であるとともに、符号５８，５９はくまとりコイルである。

【００３５】ところで、二次巻線５４，５４’を図１７に示されているように第１乃至第３の巻線５４Ａ”，５４Ｂ”，５４Ｃ”より構成して第１の巻線５４Ｃ”をＵ字状鉄心部５０Ａまたは変形Ｕ字状鉄心部５０Ａ’の中間辺部に巻回されている一次巻線５３，５３’上または下に巻回し、第２および第３の巻線５４Ａ”，５４Ｂ”を前述の第１および第２の巻線５４Ａ，５４Ｂ，５４Ａ’，５４Ｂ’と同様にＸ字状鉄心部５０Ｂまたは円形（柱）状鉄心部５０Ｂ’に互いに交差するように巻回すれば、一次巻線５３，５３’による交番磁界にもとづく起電力が第１の巻線５４Ｃ”において効率良く誘導される。

〔変形例〕次に、前述の変形Ｕ字状鉄心部５０Ａ’および円形（柱）状鉄心部５０Ｂ’より構成される鉄心５０’を有する発電装置を例にして、この発電装置を誘導電動機としても用いる場合について説明する。

【００３６】図１８において、前述と同様に変形Ｕ字状の薄鋼板を積層して鉄心６０が造られているとともに、この変形Ｕ字状の鉄心６０の両端辺部間の中空部に、前述の円形（柱）状鉄心部５０Ｂ’に替えて、図面に対して垂直状態に配されかつ両端部が例えば図示されない各ベアリングを介して回転自在に支持されている回転軸６１を有しかつその回転軸６１に対して同軸状の円柱状導体６２が遊嵌状態に配されている。また、変形Ｕ字状の鉄心６０の中間辺部には一次巻線６３が巻回されているとともに、円柱状導体６２にその円柱状導体６２が回動可能に巻回するようにして二次巻線６４である第１および第２の巻線６４Ａ，６４Ｂが互いに交差するように配設されている。こうして、鉄心６０側を固定子とし、また円柱状導体６２側を回転子として一次巻線６３により生じる回転磁界によってその円柱状導体６２の表面側に誘導される電流にもとづく誘導磁界によりそれら回転磁界と誘導磁界とによる電磁力でもって円柱状導体６２が回転されることは前述の変形例の場合と同様で、また一次巻線６３に供給した電力よりも大なる起電力が二次巻線６４に誘導されるなども前述の場合と同様である。なお、図１７に示されているように二次巻線６４を第１乃至第３の巻線より構成して第１の巻線を一次巻線６３上または下に巻回し、第２および第３の巻線を前述の第１および第２の巻線６４Ａ，６４Ｂと同様に円柱状導体６２を巻回するようにして交差するように配すれば、同様に一次巻線６３による交番磁界にもとづく起電力が第１の巻線において効率良く誘導される。他は前述と同様である。

【００３７】本実施例においては、鉄心５０，５０’，６０を薄鋼板を積層して造ったが、第１および第２の実施例と同様に、塊状であっても良く、フェライトを焼固しても良く、言うなれば磁性体で構成されるものであれば如何なるものであっも良い。

〔第４実施例－直流２極集中（全節）巻〕図１９において、鉄心７０は、例えばフェライトを焼固して造られている２個の円盤状鉄心部７０Ａ，７０Ｂより構成されている。これら円盤状鉄心部７０Ａ，７０Ｂは、図２０に示されているように一面側に同軸状に円環状溝７１Ａ，（７１Ｂ）が形成されているとともに、軸芯部には貫通孔７２Ａ，（７２Ｂ）が形成されている。ところで、一方の円盤状鉄心部７０Ａの円環状溝７１Ａ内には、図２１に示されているように６個のＳＣＲ$_1$～ＳＣＲ$_6$ から構成されるスィッチ回路７３を介して直流電源７４に接続されている一次巻線７５である３個の巻線７５Ａ，７５Ｂ，７５Ｃが重ね巻でかつ全節巻で図２２に示されているように配されて円環状溝７１Ａに対して樹脂などにより接着され固定されている。また、他方の円盤状鉄心部７０Ｂの円環状溝７１Ｂ内には、図２１に示されている二次巻線７６である３個の巻線７６Ａ，７６Ｂ，７６

Ｃが同様に重ね巻でかつ全節巻で図２２に示されているように配されて円環状溝７１Ｂに対して樹脂などにより接着され固定されている。こうして，両巻線７５，７６をサンドイッチ状にかつ相対応する各巻線７５Ａ，７５Ｂ，７５Ｃ，７６Ａ，７６Ｂ，７６Ｃが合致して重なるように挟み込むようにして両円盤状鉄心部７０Ａ，７０Ｂを互いに対向させ両貫通孔７２Ａ，７２Ｂにボルト７７を挿通し、ナット７８で締着することにより鉄心７０は組立てられている。

【００３８】こうして、一次巻線７５である３個の巻線７５Ａ，７５Ｂ，７５Ｃに直流電源７４から励磁電源としてスィッチ回路７３における各SCR_1～SCR_6のオン・オフ作用により順次に断続的に直流電流i_{a1}，i_{b1}，i_{c1}を流すと、これら直流電流i_{a1}，i_{b1}，i_{c1}によって生じる交番磁束により各交番磁界と、順次に流される直流電流i_{a1}，i_{b1}，i_{c1}の一回りにより１回転する回転磁界とが生じる。一方、これら交番磁界および回転磁界に二次巻線７６である３個の巻線７６Ａ，７６Ｂ，７６Ｃが鎖交され、これら各巻線７６Ａ，７６Ｂ，７６Ｃには各交番磁界および回転磁界による起電力が互いに位相のずれた状態で誘導されて断続的に直流電流i_{a2}，i_{b2}，i_{c2}が流れる。このようにして、二次巻線７６には、一次巻線７５に供給した電力よりも大となる起電力が誘導される。

〔変形例〕次に、前述の直流２極集中（全節）巻の発電装置を例にして、この発電装置を誘導電動機として用いる場合について説明する。

【００３９】図２３および図２４において、上壁を有する円筒形状の固定子枠８０の下端側には、前述のように円環状に配列されている一次巻線８１および二次巻線８２が上面に上下に積層され固定されて設けられ、例えばフェライトを焼固して造られている鉄心としての円形状下壁部８３が嵌設されている。これら一次巻線８１および二次巻線８２は、前述の通りに各３個の巻線から構成され直流２極集中巻で配設されている。

【００４０】ところで、円環状の一次巻線８１および二次巻線８２の中空部には、回転磁界の軸芯に位置して固定子枠８０の上壁および円形状下壁部８３に設けられている各孔８４，８５に各ベアリング８６，８７を介して＊回転自在に支持されている回転軸８８を有する円盤状導体８９が、固定子枠８０の上壁と一次巻線８１との間に配されて設けられている。こうして、一次巻線８１および二次巻線８２側を固定子とし、また円盤状導体８９側を回転子として一次巻線８１によって生ずる回転磁界によりその円盤状導体８９の表面側に流れる電流にもとづき、前述の変形例と同様に円盤状導体８９が回転されるとともに、前述のように二次巻線８２には一次巻線８１に供給した電力よりも大なる起電力が誘導される。

【００４１】なお、本実施例においては、一次巻線８１および二次巻線８２側を固定子とし、円盤状導体８９側を回転子としたが、一次巻線８１および二次巻線８２側を回転子、円盤状導体８９側を固定子としても良い。

【００４２】本実施例においては、一次巻線７５，８１を上側に二次巻線７６，８２を下側に配設したが、一次巻線７５，８１を下側に二次巻線７６，８２を上側に配設しても良い。また、前述の各実施例と同様に重ね巻について説明したが、波巻または鎖巻であって良く、また全節巻の場合について説明したが短節巻であっても良く、言うなれば分布巻を含み如何なる巻線方法であっても良い。

【００４３】本実施例においては、鉄心７０，円形状下壁部８３はフェライトを焼固して造られているが、磁性体で構成されるものであれば如何なるものでも良い。

〔第５実施例－三相交流単相（全節）巻〕図２５において、鉄心９０は、下面側に左右方向に等間隔でかつ図面に対して垂直方向にスロット９１が形成されている第１の鉄心部９０Ａと、上面側に左右方向に等間隔でかつ図面に対して垂直方向に第１の鉄心部９０Ａのスロット９１間における突出部９２の先端側が嵌入される切込溝９３が形成されている第２の鉄心部９０Ｂとが互いに磁気的に結合されることで構成されている。これら第１および第２の鉄心部９０Ａ，９０Ｂは、例えば薄鋼板を積層することで、またはフェライトを焼固するなどして造られている。こうして、第１の鉄心部９０Ａの突出部９２を第２の鉄心部９０Ｂの切込溝９３に嵌入させることで鉄心９０が組立てられている。

【００４４】

【数２】

前記第１の鉄心部９０Ａのスロット９１内における奥側には、図示されていない三相交流電源に接続されている一次巻線９４であるＵ１相巻線９４Ａ，Ｖ１相巻線９４ＢおよびＷ１相巻線９４Ｃが図２６（ａ）に示されているように順次に配され嵌入されている。また、スロット９１内における手前側には、図２６（ｂ）に示されている二次巻線９５であるＵ２相巻線９５Ａ，Ｖ２相巻線９５ＢおよびＷ２相巻線９５Ｃが同様に順次に配されて嵌入されている。なお、図２５，図２６（ａ），（ｂ）における符号①～⑱はスロット番号を示している。

【００４５】こうして、一次巻線９４であるＵ１相巻線９４Ａ，Ｖ１相巻線９４ＢおよびＷ１相巻線９４Ｃに図示されない三相交流電源から励磁電流として平衡三相交流電流i_{a1}，i_{b1}，i_{c1}を流すと、これら平衡三相交流電流i_{a1}，i_{b1}，i_{c1}によって生じる交番磁束により図２５に示されているように各交番磁界９６と、図示され

ている矢印方向に進む進行磁界９７とが生じる。なお、図２５における交番磁界９６などは、Ｕ１相巻線９４Ａに平衡三層交流電流i_{a1}，i_{b1}，i_{c1}のうち電流i_{a1}が最大に流れているときを示している。一方、これら各交番磁界９６および進行磁界９７により二次巻線９５であるＵ２相巻線９５Ａ，Ｖ２相巻線９５ＢおよびＷ２相巻線９５Ｃには、前述のように一次巻線９４に供給した電力よりも大なる起電力が誘導されて図２６（ｂ）に示されているように平衡三相交流電流i_{a2}，i_{b2}，i_{c2}が流れる。

〔変形例〕次に、前述の三相交流単相（全節）巻の発電装置を例にして、この発電装置を誘導電動機として、いわゆるリニアモータとしても用いる場合について説明する。

【００４６】図２７において前述と同様に薄鋼板を積層して、またはフェライトを焼固するなどして一次側としての鉄心１００が造られているとともに、この鉄心１００の下面側には左右方向に等間隔にスロット１０１が形成されている。このスロット１０１内における奥側には、前述のように一次巻線１０２であるＵ１相巻線１０２Ａ，Ｖ１相巻線１０２ＢおよびＷ１相巻線１０２Ｃが順次に配され嵌入されている。また、スロット１０１内における手前側には、同様に二次巻線１０３であるＵ２相巻線１０３Ａ，Ｖ２相巻線１０３ＢおよびＷ２相巻線１０３Ｃが順次に配されて嵌入されている。

【００４７】一方、鉄心１００の下方側にはその鉄心１００に沿うように二次側としての導体板１０４が配設されている。こうして、鉄心１００側を固定側とし、導体板１０４側を可動側とすれば、一次巻線１０２によって生じる図示されている矢印方向に進む進行磁界により導体板１０４の表面側に誘導される電流にもとづく誘導磁界によってそれら進行磁界と誘導磁界とによる電磁力でもって導体板１０４が矢印方向に移動する。また、一次巻線１０２に供給した電力よりも大なる起電力が二次巻線１０３に誘導されるなどは前述の場合と同様である。

【００４８】なお、前述においては、鉄心１００側を固定側とし、導体板１０４側を可動側としたが、鉄心１００側を可動側、導体板１０４を固定側としても良い。本実施例においては、三相交流の単相巻で全節巻の場合について説明したが二相巻，重ね巻、また波巻または鎖巻、更には短節巻であっても良く、言うなれば如何なる巻線方法であっても良い。

【００４９】本実施例においては、一次巻線９４，１０２をスロット９１，１０１内における奥側に，二次巻線９５，１０３を手前側に配したが、一次巻線９４，１０２を手前側に、また二次巻線９５，１０３を奥側に配しても良く、手前側、奥側に区別なく配しても良い。

【００５０】本実施例においては、鉄心９０，１００は薄鋼板を積層して、またはフェライトを焼固して造られているが、磁性体で構成されるものであれば如何なるものであっても良い。

【００５１】前述の各実施例および各変形例において二次巻線に誘導される起電力の少なくとも一部を一次巻線に供給すれば、初期の始動時を除き外部からの電気エネルギーの供給を必要とすることなく自己発電、更には誘導電動機，リニアモータとしても機能を有する。また、一次巻線に流れる電流の周期を短くして交番磁界の交番数および回転磁界の回転数を大とすれば、また多相巻の相数が増すにつれて二次巻線に誘導される起電力は大となることは言うまでもない。また、進行磁界には、前述の回転磁界などの他、前後方向に可逆的に移動する移動磁界をも含むものとする。

【００５２】以上に説明したように、本発明は、種々に変更可能なことは明らかである。このような変更は本発明の精神および範囲に反することなく、また当業者にとって明瞭な全てのそのような変形、変更は請求の範囲に含まれるものである。

【図面の簡単な説明】

【図１】図１は、本発明による発電装置の第１実施例を説明するための横断面斜視図である。

【図２】図２は、本発明による発電装置の第１実施例を説明するための横断面図である。

【図３】図３（ａ），（ｂ），（ｃ）は、本発明による発電装置の第１実施例を説明するための回路図および巻線図である。

【図４】図４は、本発明による発電装置の第１実施例を説明するための回転磁界の発生図である。

【図５】図５（ａ），（ｂ），（ｃ）は、本発明による発電装置の第１実施例における第１態様例の図２に対応する横断面図および図３（ｂ），（ｃ）に対応する巻線図である。

【図６】図６は、本発明による発電装置の第１実施例における第１態様例の回転磁界の発生図である。

【図７】図７（ａ），（ｂ），（ｃ）は、本発明による発電装置の第１実施例における第２態様例の図２に対応する横断面図および図３（ｂ），（ｃ）に対応する巻線図である。

【図８】図８は、第１実施例の発電装置を誘導電動機としても用いる場合の第１変形例の縦断面図である。

【図９】図８は、第１実施例の発電装置を誘導電動機としても用いる場合の第１変形例の横断面図である。

【図１０】図１０は、第１実施例の発電装置を誘導電動機としても用いる場合の第２変形例の縦断面図である。

【図１１】図１１は、第１実施例の発電装置を誘導電動機としても用いる場合の第２変形例の横断面図である。

【図１２】図１２（ａ），（ｂ），（ｃ）は、本発明による発電装置の第２実施例を説明するための図２に対応する横断面図および図３（ｂ），（ｃ）に対応する巻線図である。

【図１３】図１３は、本発明による発電装置の第２実施

例を説明するための回路図である。

【図１４】図１４は、本発明による発電装置の第３実施例を説明するための平面外観図である。

【図１５】図１５は、本発明による発電装置の第３実施例を説明するための回路図である。

【図１６】図１６は、本発明による発電装置の第３実施例における第１態様例の平面外観図である。

【図１７】図１７は、本発明による発電装置の第３実施例における第２態様例の回路図である。

【図１８】図１８は、第３実施例の発電装置を誘導電動機としても用いる場合の第１態様例に対応する変形例としての平面外観図である。

【図１９】図１９は、本発明による発電装置の第４実施例を説明するための縦断面図である。

【図２０】図２０は、本発明による発電装置の第４実施例を説明するための鉄心部の斜視図である。

【図２１】図２１は、本発明による発電装置の第４実施例を説明するための回路図である。

【図２２】図２２は、本発明による発電装置の第４実施例を説明するための巻線配置図である。

【図２３】図２３は、第４実施例の発電装置を誘導電動機としても用いる場合の変形例を説明するための縦断面図である。

【図２４】図２４は、図２３における線Ａ－Ａ’における横断面図である。

【図２５】図２５は、本発明による発電装置の第５実施例を説明するための図２に対応する横断面図である。

【図２６】図２６（ａ），（ｂ）は、本発明による発電装置の第５実施例を説明するための図３（ｂ），（ｃ）に対応する巻線図である。

【図２７】図２７は第５実施例の発電装置をリニアモータとしても用いる場合の縦断面図である。

【符号の説明】

１０，１０’，１０”，２１，２１’，４０，５０，５０’，６０，７０，９０，１００　鉄心

１１，１１’，１１”，２２，２２’，４１，９１，１０１　スロット１２，９２　突出部

１３，５１，９３　切込溝

１４　三相交流電源

１５，１５’，１５”，２３，４３，５３，５３’，６３，７５，８１，９４，１０２　一次巻線

１６，１６’，１６”，２４，４５，５４，６４，７６，８２，９５，１０３　二次巻線

１７，１７’，９６　交番磁界

１８，１８’，９７　回転磁界

２０，２０’，８０　固定子枠

２５，２６，８４，８５　孔

２７，２８，８６，８７　ベアリング

２９，２９’，６１，８８　回転軸

３０，６２　円柱状導体

３０’　円環筒状導体

４２，５２　単層交流電源

４４，４６　コンデンサ

５５，５６，５８，５９　くまどりコイル

５７　空隙

７３　スイッチ回路

７４　直流電源

７７　ボルト

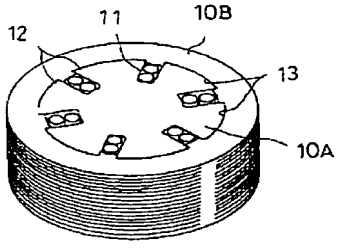
７８　ナット

８３　円形柱状下壁部

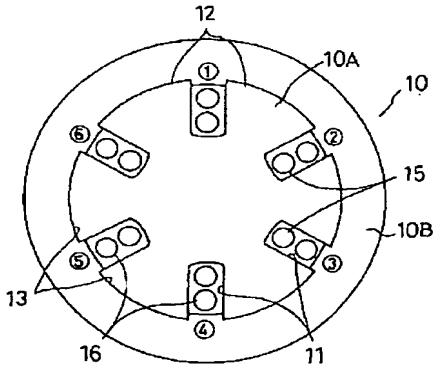
８９　円盤状導体

１０４　導体板

【図１】



【図２】



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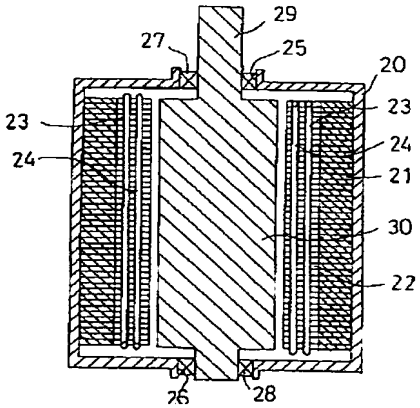
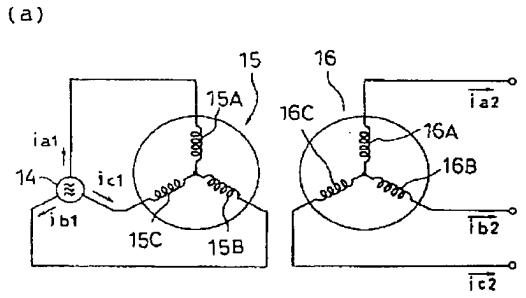


【図３】



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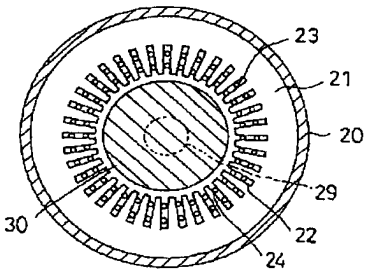
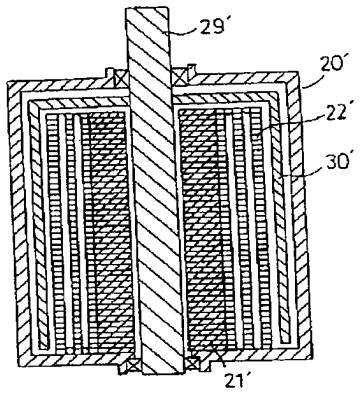


【図１０】



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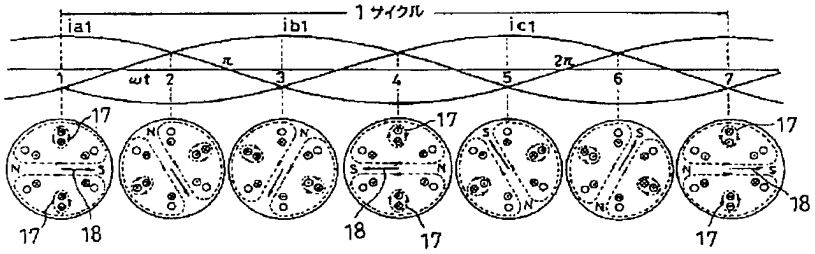

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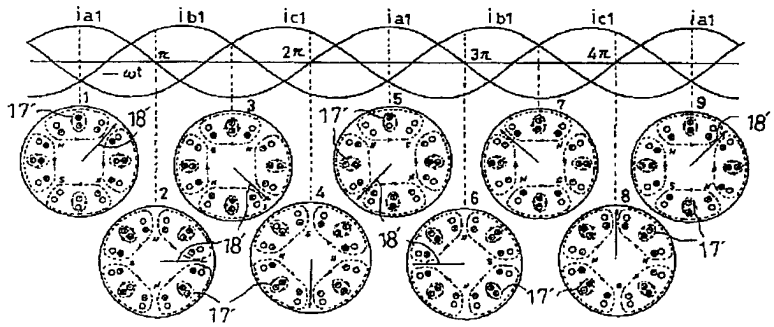
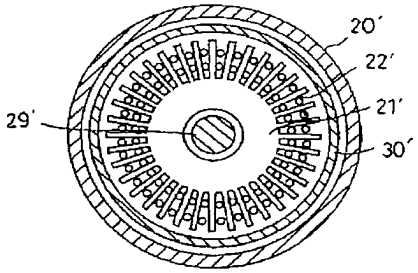


【図１１】



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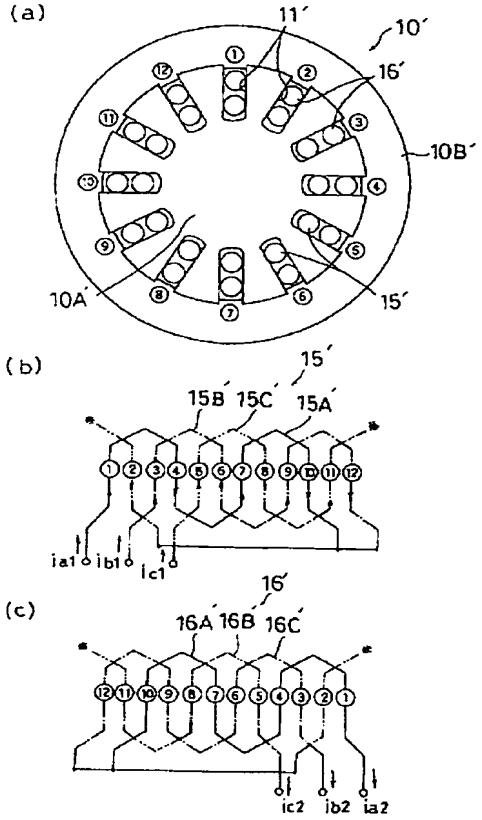
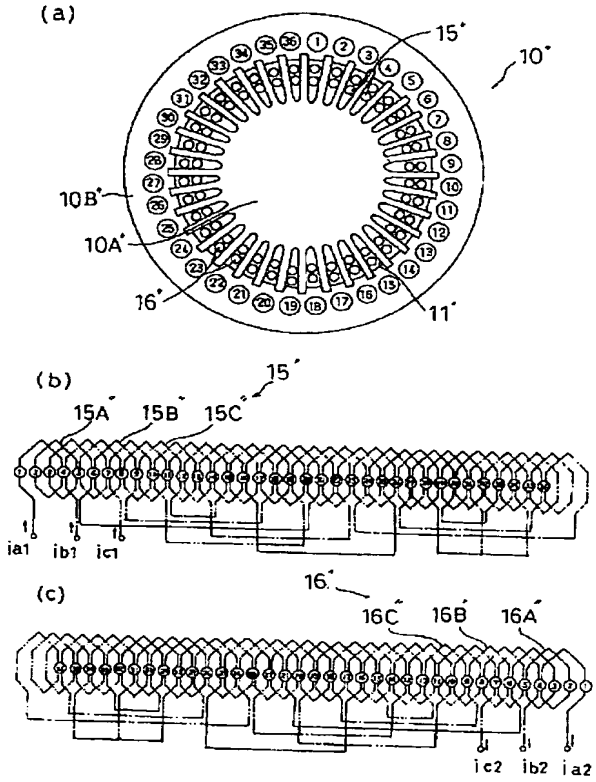
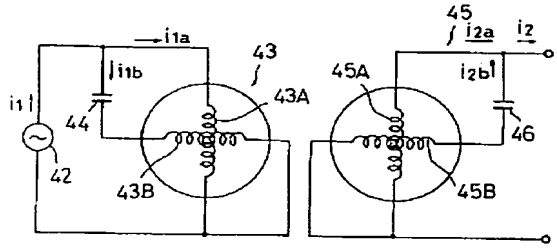


【図７】

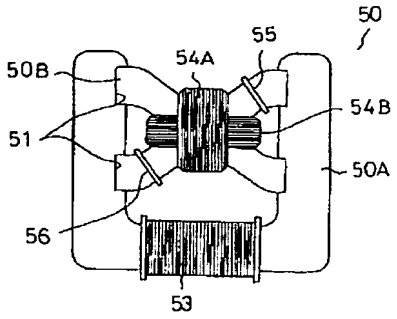


【図１４】

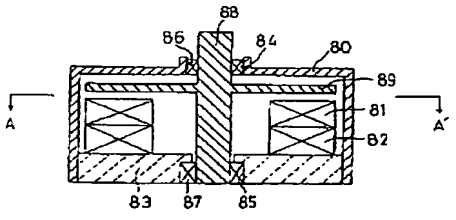
【図１３】

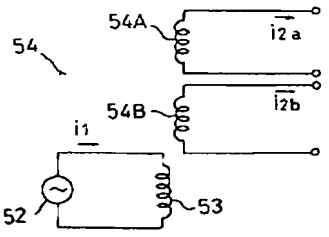


【図１５】

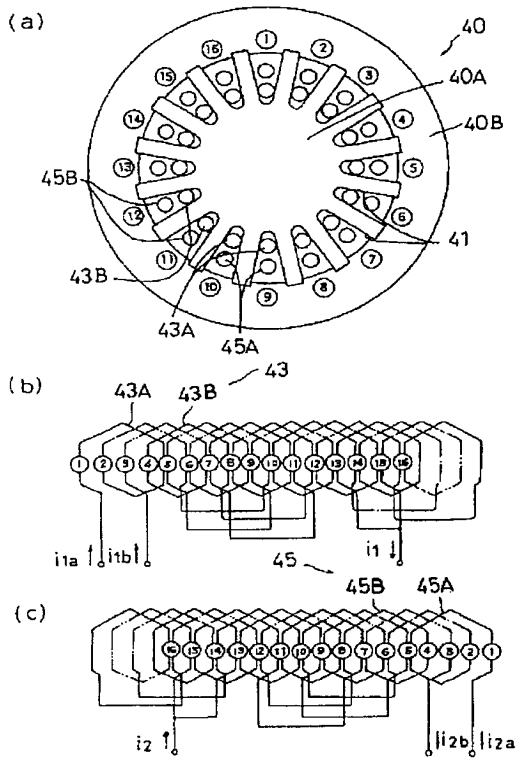


【図２３】

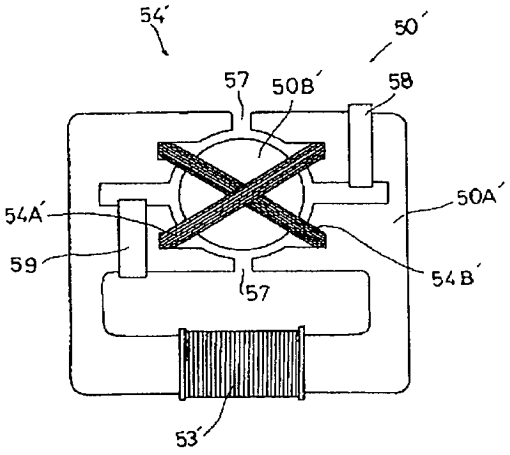




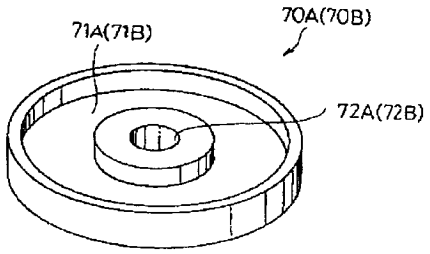
【図１２】



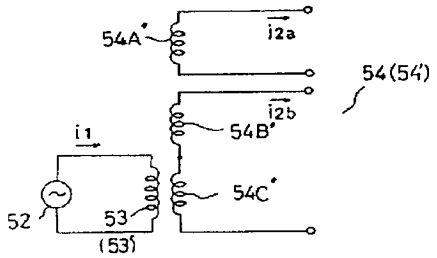
【図１６】



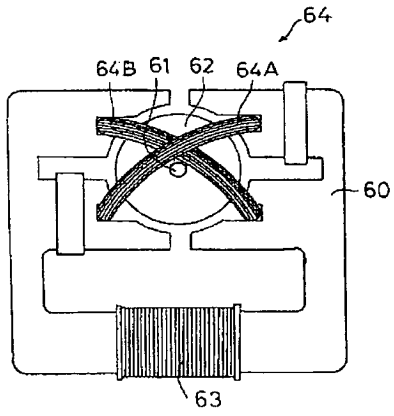
【図２０】



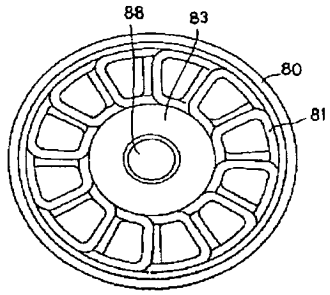
【図１７】



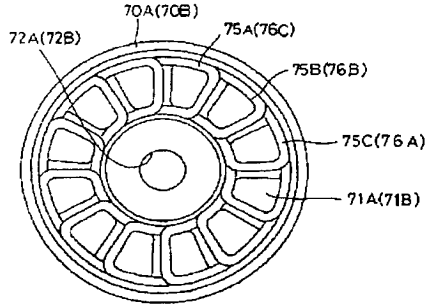
【図１８】



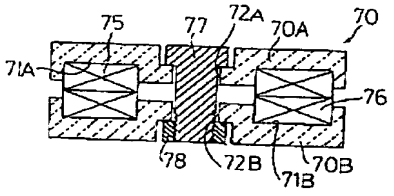
【図２４】



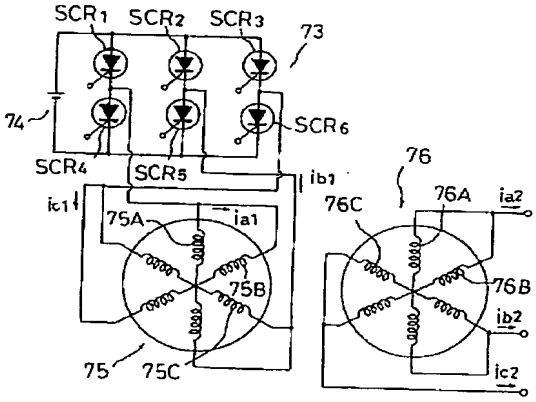
【図２２】



【図１９】



【図２１】



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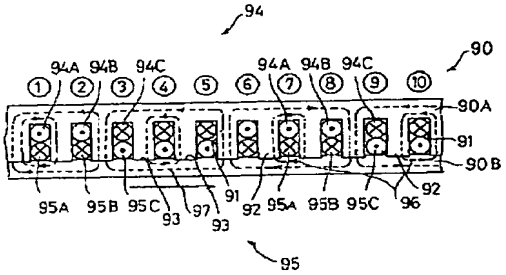
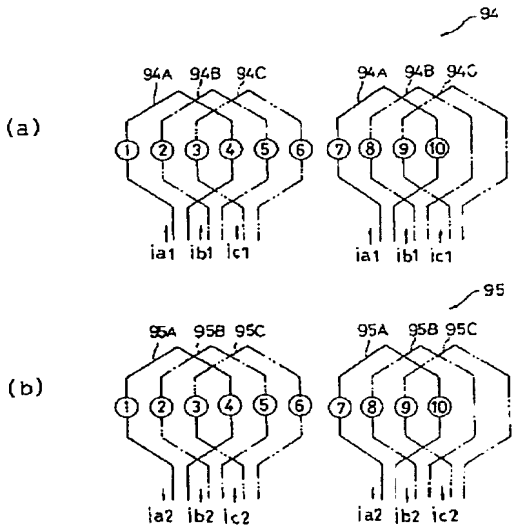


【図２６】



【図２７】